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With Special Reference to Technique

BY

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NEW YORK AND HAMBURG

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An Experimental Basis for Intravenous Vaccine Therapy in Chronic Arthritis With a Summary of Results Obtained in Patients*†

By B. J. CLAWSON, M.D., and M. WETHERBY, M.D., Minneapolis, Minn.

THE factors considered as a basis for intravenous streptococcic vaccination reported in this paper are (1) etiology and (2) a method of vaccination which will not produce hypersensitiveness (allergy) but will desensitize patients already hypersensitive and will produce a high degree of protective immunity.

ETIOLOGY

The belief that most cases of chronic arthritis are infectious in origin is quite generally accepted. The exact infectious agent and the manner and the form in which the agent finds its way into the joints are not so generally agreed upon. Some people believe that there is a direct infection of the joint by the living organisms. Others look upon the lesions in the joint as a response to inanimate parts of the infectious agent which lives in some remote focus. The etiology of chronic arthritis has been studied from the bacteriological, immunological, and pathological standpoints.

Bacteriology. Streptococci have been recovered from chronic arthritis in higher percentages and by a greater number of workers than any other organism. The materials cultured have been the blood, the joint fluid and tissues, the lymphnodes, and the subcutaneous nodules. The number of cases and the sources of the materials cultured with the percentage of positive streptococcic cultures obtained by many workers are given in tables 1, 2, 3, 4, and 5. The average percentage of positive streptococcic cultures obtained are as follows: blood, 35 per cent; joint fluids, 35 per cent; joint tissues, 44 per cent; lymphnodes, 61 per cent; and subcutaneous nodules, 72 per cent. Twelve hundred and ninety-seven cultures have been reported. Five hundred and twenty (40 per cent) were positive for streptococci (table 6). Recent workers have raised these percentages very decidedly.

The kind of streptococci recovered has, in the main, been *Streptococcus viridans*. Beta hemolytic streptococci have been found in a small percentage of the cases. Cecil, Nicholls and Stainsby⁴ most frequently recovered atypical hemolytic streptococci.

The strains studied by us have in most cases cross agglutinated with one

*Presented at the San Francisco meeting of the American College of Physicians, April 6, 1932.

†From the Departments of Pathology and Medicine of the University of Minnesota.

TABLE 1
Bacteriology of Chronic Arthritis: Blood

YEAR	AUTHOR	NO. OF CASES	NO. POS.	PER CENT POS.	KINDS
1917	Moon and Edwards ¹	123	32	26	<i>S. viridans</i>
1920	Richards ²	104	15	14	<i>S. viridans</i>
1927	Hadjopoulos and Burbank ³	145	15	10	<i>S. viridans</i>
1929- 1931	Cecil, Nicholls and Stainsby ⁴	154	96	62	<i>S. viridans</i> and atypical <i>S. hemolyticus</i>
1931	Klugh ⁵	74	53	72	<i>S. viridans</i>
1931	Dawson, Olmstead and Boots ⁶	80	2	2.5	<i>S. viridans</i>
1931	Gray and Gowan ⁷	71	41	58	<i>S. viridans</i>
1931	Wetherby and Clawson ⁸	50	25	50	<i>S. viridans</i> 24 <i>S. hemolyticus</i> 1
	Total	801	279	35	

TABLE 2
Bacteriology of Chronic Arthritis: Joint Fluid

YEAR	AUTHOR	NO. OF CASES	NO. POS.	PER CENT POS.	KINDS
1920	Richards ²	54	4	7	<i>S. viridans</i>
1922	Billings, Coleman and Hibbs ⁹	14	6	43	<i>S. viridans</i>
1928	Forkner, Shands and Poston ¹⁰	60	11	18	<i>S. viridans</i>
1930	Shands ¹¹	33	17	52	<i>S. viridans</i> 14 <i>S. anhemolyticus</i> 2 <i>S. hemolyticus</i> 1
1931	Cecil, Nicholls and Stainsby ¹²	49	33	67	<i>S. viridans</i> and atypical <i>S. hemolyticus</i>
1931	Gray and Gowan ⁷	8	5	62.5	<i>S. viridans</i>
	Total	218	76	35	

TABLE 3
Bacteriology of Chronic Arthritis: Joint Tissues

YEAR	AUTHORS	TISSUES CULTURED	NO. OF CASES	NO. POS.	PER CENT POS.	KINDS
1902	Poynton and Paine ¹³	Synovial membrane	1	1	100	Diplococcus
1928	Cecil, Nicholls and Stainsby ¹²	Head of femur	2	2	100	Atypical S. hemolyticus
1930	Margolis and Dorsey ¹⁴	Epiphyseal marrow and bone	15	7	47	S. viridans S. anhemolyticus Diphtheroids
1930	Margolis and Dorsey ¹⁴	Synovial membrane	14	4	29	S. viridans Diphtheroids
	Total		32	14	44	

TABLE 4
Bacteriology of Chronic Arthritis: Lymph Glands

YEAR	AUTHOR	NO. OF CASES	NO. POS.	PER CENT POS.	KINDS
1914	Rosenow ¹⁵	54	32	59	S. viridans
1922	Billings, Coleman and Hibbs ⁹	27	21	78	S. viridans S. hemolyticus Mixed
1928	Forkner, Shands and Poston ¹⁰	20	9	45	S. viridans
1928	Baer ¹⁶	10	7	70	S. viridans and S. hemolyticus
1929	Poston ¹⁷	117	69	59	S. viridans S. anhemolyticus
	Total	228	138	61	

TABLE 5
Bacteriology of Chronic Arthritis: Subcutaneous Nodules

YEAR	AUTHOR	NO. OF CASES	NO. POS.	PER CENT POS.	PERCENT POS.	KINDS
	Billings, Coleman and Hibbs	1	1	100		S. viridans
1932	Clawson and Wetherby	17	12	71		S. viridans
	Total	18	13	72		

another and equally well with strains of acute rheumatic origin. The strains of streptococci from both acute rheumatic fever and chronic arthritis have in our experience tended to fall into a fairly well defined group which generally grew poorly when first isolated and produced a faint green discoloration on the blood agar plate when incubated at 37°C for 24 hours. These organisms do not seem to represent a specific strain.

Immunological Reactions. The two immunological reactions studied in patients with chronic arthritis were (1) hypersensitiveness (allergy) as indicated by the skin test and (2) streptococci agglutination.

Birkhaug¹⁸ showed by skin tests that patients having chronic arthritis

were hypersensitive to streptococci protein in a higher percentage than normal persons. We obtained similar results in a study of 127 cases of chronic arthritis and 107 normal persons (table 7).

Nicholls and Stainsby¹⁹ found that the serums of patients with chronic arthritis agglutinated streptococci in higher dilutions than the serums from normal persons. We tested the serums from 81 normal individuals and from 60 patients with chronic arthritis (table 8). The strain of streptococcus used had been isolated from a case of chronic arthritis. The greatest percentage of the serums of the normal people showed agglutination in the dilution of 1:400 and the greatest number of the chronic arthritics in the dilu-

TABLE 6
Bacteriology of Chronic Arthritis: Summary

SOURCE	NO. CASES	NO. POS.	PER CENT POS.
Blood	801	279	35
Joint fluid	218	76	35
Joint tissues	32	14	44
Lymphnodes	228	138	61
Subcutaneous nodules	18	13	72
	1297	520	40

TABLE 7
Intradermal skin tests with *Streptococcus viridans* in patients with chronic arthritis

CONDITION	NO. CASES	NO. POSITIVE	PER CENT POSITIVE
Chronic arthritis	127	112	88.1
Normal persons	107	53	49.5

TABLE 8
Streptococci Agglutination in Normal People and in Patients with Chronic Arthritis

DILUTIONS	1:0	1:50	1:100	1:200	1:400	1:800	1:1600	1:3200	1:6400	1:12800
NORMAL, 81 CASES		1	5	2	18.5	44	26	2	0	0
CHRONIC ARTHRITIS, 60 CASES		0	0	1.6	6.6	31.6	38.3	10	10	1.6

tion of 1:800. Only 28 per cent of the normal persons showed agglutination above 1:400. The per cent above 1:400 in the chronic arthritic patients was 60.

The higher percentage of positive skin tests and streptococcic agglutination titers in patients with chronic arthritis suggests a possible etiological relationship of the streptococci to chronic arthritis.

Pathological Findings. The cellular reactions in the joint capsules and membranes as described by Nichols and Richardson,²⁰ Margolis and Dorsey,¹⁴ and others were polyblastic in character and decidedly resembled those described by Swift²¹ in joint lesions in acute rheumatic fever.

We observed subcutaneous nodules in 30 per cent of a series of 300 cases of chronic arthritis. We found the cellular reaction in these nodules, as did Coates and Coombs,²² to be similar to the reactions in subcutaneous nodules and heart valves in acute rheumatic fever and in heart valves in subacute bacterial endocarditis. The reaction was also similar to that in subcutaneous nodules produced experimentally in rabbits by injecting streptococci.

The bacteriological, immunological, and pathological findings described above tend to support a causal relation between streptococci and chronic arthritis.

METHOD OF VACCINATION

An effort was made to see what could be done by vaccination toward protecting patients having chronic arthritis. Animal experiments were carried on toward developing an efficient method of vaccination which

would give the highest degree of immunity against streptococci.

The things necessary in a vaccine for chronic arthritis are (1) not to make the patient hypersensitive to the protein in the vaccine, (2) to desensitize the patients who are already hypersensitive, and (3) to bring about a high degree of protective immunity.

The following experiments in rabbits showed that the intravenous injections of streptococci met the three above requirements while the subcutaneous injections did not.

Hypersensitiveness (Allergy). The degree of tissue response as an indicator of hypersensitiveness is shown in table 9. The tissue response in terms of percentage was compared in normal, hypersensitive, and immune rabbits. The hypersensitiveness was produced by injecting animals subcutaneously in one area with a mixture of agar and streptococci. The immune state was brought about by repeated intravenous injections of streptococci. Each of the animals in the three groups was then injected subcutaneously in each of ten places on the back with a known number of streptococci. All animals were killed five days later and the number and the size of the nodules at the sites of the small multiple subcutaneous injections were determined. The tissue response (cellular reaction) in these nodules was similar to the type of reaction found in lesions in chronic arthritis. The tissue response in the normal animals was 3.2 per cent; in the hypersensitive animals, 88 per cent; and in the immune animals, 1.1 per cent. The average streptococcic agglutination titer in the hypersensitive animals was 1:3200; and in the immune animals,

1:200,000. These experiments confirmed the findings of Swift²³ in that animals injected subcutaneously were made hypersensitive while the animals injected intravenously were not. The subcutaneous method of giving a vaccine will not desensitize the hypersensitive animals, for hypersensitiveness is produced and maintained by subcutaneous injections.

Desensitization. Ten animals were made hypersensitive as described above and later vaccinated intravenously with *Streptococcus viridans*. The degree of tissue response, indicative of hypersensitiveness in these ten vaccinated animals, was compared with that in hypersensitive animals which had not been vaccinated (table 10). The non-vaccinated hypersensitive animals showed 88 per cent of tissue response. The hypersensitive animals which had been vaccinated intravenously gave a tissue response of 5.2 per cent. The average agglutination titer in the non-vaccinated hypersensitive animals was 1:3200; and in the vaccinated hypersensitive animals, 1:50,000. The hypersensi-

tive animals were desensitized by the intravenous method of vaccination. The intravenous method met the two necessary requirements in not bringing about a state of hypersensitiveness (table 9) and in desensitizing animals which were already hypersensitive (table 10). As far as hypersensitiveness is concerned the intravenous method of vaccination rather than the subcutaneous method should be used.

Protective Immunity. It was seen in the preceding experiments that the streptococcic agglutination titers were decidedly higher in animals injected intravenously than in animals injected subcutaneously. To test the protective merits of the subcutaneous and intravenous methods of injecting a streptococcic vaccine two groups of animals were selected. Group 1 was vaccinated subcutaneously at five weekly intervals with one billion killed streptococci. Group 2 was vaccinated intravenously at the same periods with the same doses. The streptococcic agglutination titers of the two groups were then determined (table 11). The animals vac-

TABLE 9
Percentage of Tissue Response to Subcutaneous Injections of Streptococci in Normal, Hypersensitive (Allergic), and Immune Animals

NO.	NORMAL	HYPERSENSITIVE	IMMUNE
1	0.3 per cent	10 per cent	0.1 per cent
2	0.1	6	0.2
3	0.2	9	0.0
4	0.1	8	0.0
5	0.2	10	0.2
6	0.3	8	0.2
7	2.0	10	0.2
8	0.0	10	0.0
9	0.0	8	0.2
10	0.0	9	0.0
	3.2 per cent	88 per cent	1.1 per cent
Average Agglutination titers			
NORMAL	1:25		
HYPERSENSITIVE	1:3200		
IMMUNE	1:200,000		

TABLE 10

Change in Percentage of Tissue Response to Subcutaneous Injections of Streptococci in Hypersensitive Animals Following Intravenous Vaccination (*S. viridans*)

NO.	NOT VACCINATED	VACCINATED
1	10 per cent	0.0 per cent
2	6	0.0
3	9	0.0
4	8	0.0
5	10	0.0
6	8	0.0
7	10	0.0
8	10	0.2
9	8	5.0
10	9	0.0
88 per cent		5.2 per cent
Average Agglutination Titers		
NOT VACCINATED		1:3200
VACCINATED		1:50,000

TABLE 11

Relative Immunity Produced by Subcutaneous and Intravenous Vaccine Treatment

NO.	NORMAL	SUBCUTANEOUS	INTRAVENOUS
1	1:50	1:3200	1:400,000
2	1:100	1:6400	1:200,000
3	1:0	1:3200	1:400,000
4	1:0	1:1600	1:400,000
5	1:0	1:1600	1:400,000
	1:30	1:3200	1:360,000

inated subcutaneously had titers ranging from 1:1600 to 1:6400. The animals vaccinated intravenously had titers of from 1:200,000 to 1:400,000. If the height of the agglutination titer can be relied upon as an indicator of the degree of immunity, then it is obvious that a much higher degree of protection can be produced against streptococci by intravenous injections than by subcutaneous injections of a vaccine.

The evidence of a correlation between the height of an agglutination titer and protection was shown by comparing the rate at which streptococci were killed in normal animals and in animals which had a high agglutination titer and by comparing the bactericidal power of the blood of vaccinated and

non-vaccinated chronic arthritic patients.

Normal rabbits and rabbits highly immune to streptococci were injected intravenously with 50 million live streptococci. In 15 minutes 1 c.c. of blood was taken from the heart of each animal and plated on agar. In two hours the animals were killed and a gram of liver from each animal was ground in a mortar and plated in dilutions on agar. It was found in the series of ten rabbits of each group that the rate of disappearance of the streptococci from the blood in 15 minutes was three times greater in the immune than in the normal animals (table 12). The rate at which the streptococci were killed in the livers of the animals in

two hours was 3.3 times greater in the immune animals (table 13). The streptococcic agglutination titers averaged 1:45 in the normal animals and 1:170,000 in the immune animals.

It was found by using the method of Sutliff and Rhoades²⁴ for determining the bactericidal power of whole blood that the whole blood of vaccinated chronic arthritic patients with an agglutination titer of 1:6400 or more had a much greater bactericidal power for

streptococcic agglutination than the blood of non-vaccinated patients with an average streptococcic agglutination titer of 1:200 (table 14).

Since the agglutination titer rises decidedly higher by the intravenous method of vaccination than by the subcutaneous method and since the above experiments in animals and patients showed a correlation between an elevated agglutination titer and desensitization and protective immunity, the

TABLE 12
Organisms per Cubic Centimeter Alive 15 Minutes after Injecting 50,000,000 Streptococci Intravenously into Normal Animals and Animals Made Immune to Streptococci

NORMAL		IMMUNE	
AGGLUTINATION TITER	NO. PER C.C.	AGGLUTINATION TITER	NO. PER C.C.
1:50	55	1:200,000	5
1:50	40	1:200,000	30
1:100	41	1:200,000	10
1:100	44	1:50,000	13
1:50	40	1:200,000	8
1:100	47	1:200,000	13
1:0	50	1:50,000	17
1:0	70	1:200,000	21
1:0	23	1:200,000	14
1:0	25	1:200,000	16
1:45	435 ₂	1:170,000	147 ₁

TABLE 13
Number of Streptococci Alive in a Gram of Liver Two Hours after Injecting 50,000,000 Organisms into Normal and Immune Animals

NO.	NORMAL		IMMUNE	
	AGGLUTINATION	NO. PER GRAM	AGGLUTINATION	NO. PER GRAM
1	1:0	3,500	1:400,000	650
2	1:50	4,200	1:400,000	2,500
3	1:0	7,000	1:400,000	600
4	1:0	2,500	1:100,000	300
5	1:0	4,500	1:100,000	1,500
6	1:50	2,250	1:200,000	1,350
7	1:50	10,200	1:400,000	4,000
8	1:100	10,000	1:200,000	2,800
9	1:0	5,600	1:400,000	1,000
10	1:0	6,000	1:200,000	2,000
	1:25	55,750 3.3+	1:280,000	16,650 1.

intravenous method of administering a vaccine would seem to be the one of choice.

Type or Species Specificity in Desensitization and Protective Immunity.

If desensitization and immunity should be type (strain) specific, then it would seem that autogenous vaccines should probably be used in most cases. If, on the other hand, these two phenomena should be only species (group) specific, then a stock streptococcic vaccine would in most cases likely be sufficient. This is an important consideration, for it would be impracticable to use autogenous vaccine in treating chronic arth-

ritis in most cases. Experiments were carried on with animals to determine the relation of acquired desensitization and immunity to type and species specificity.

Animals made hypersensitive to *Streptococcus viridans* of acute rheumatic origin were vaccinated intravenously with *Streptococcus hemolyticus* from a case of puerperal sepsis. The degree of tissue response to *Streptococcus viridans* indicative of hypersensitiveness was determined and compared with non-vaccinated animals which had been made hypersensitive to *Streptococcus viridans* (table 15). The

TABLE 14

A Comparison of the Bactericidal Power and the Agglutination Titers (1:6400 or more) of the Blood of Treated and Untreated Patients with Chronic Arthritis.

GROUP	NO. OF STREPTOCOCCI KILLED PER C.C.		AGGLUTINATION TITERS	
	VACCINATED	NOT VACCINATED	VACCINATED	NOT VACCINATED
1	40,000	0	1:6400	1:100
2	52,000	0	1:6400	1:200
3	38,000	3,800	1:6400	1:400
4	25,000	0	1:12800	1:400
5	163,000	0	1:6400	1:100
6	160,000	1,600	1:12800	1:800
7	32,000	320	1:25000	1:3200
8	36,000	360	1:6400	1:200
9	3,200	50	1:6400	1:200
10	3,800	0	1:12800	1:100
	90	1		

TABLE 15

Change in Percentage of Tissue Response to Subcutaneous Injections of Streptococci (*S. viridans*) into Hypersensitive Animals (*S. viridans*) following Intravenous Vaccination (*S. hemolyticus*)

NO.	NOT VACCINATED	VACCINATED
1	10 per cent	0.0 per cent
2	6	0.0
3	9	0.0
4	8	0.0
5	10	0.0
6	8	0.0
7	10	0.0
8	10	0.0
9	8	0.2
10	9	0.2
	88 per cent	0.4 per cent

response in the non-vaccinated animals was 88 per cent and in the animals vaccinated with *Streptococcus hemolyticus*, 0.4 per cent. The desensitization did not seem to be type specific.

In a series of ten animals each animal was immunized with a different strain of streptococcus of chronic arthritic origin and later each of the animals was injected with 50 million organisms of another strain of streptococcus. The rapidity with which this organism disappeared from the blood (tested in 15 minutes) and from the liver (tested in two hours) was much greater than in normal animals. These experiments suggested that protective immunity also was not type specific.

Non-specific Protein Therapy (B. typhosus) in Streptococcic Infections. Intravenous injections of *B. typhosus* are commonly used in treating chronic arthritis. Experiments were performed in animals to see what relation intravenous injections of *B. typhosus* bore to the desensitization of animals hypersensitive to *Streptococcus viridans*

and to the protection of animals against *Streptococcus viridans*.

Animals were made hypersensitive to *Streptococcus viridans* and vaccinated intravenously with *B. typhosus* (table 16). The tissue response to *Streptococcus viridans* in these animals was compared with the response in non-vaccinated hypersensitive animals. The response in the non-vaccinated animals was 88 per cent and in the animals vaccinated with *B. typhosus*, 82 per cent, as compared with 0.7 per cent in the hypersensitive animals vaccinated with streptococci. It was concluded that desensitization to streptococci was not brought about by a non-specific protein reaction.

Animals vaccinated intravenously with *B. typhosus* developed a high agglutination titer to *B. typhosus* but the titer to *Streptococcus viridans* was raised but slightly. When these animals were injected intravenously with 50 million streptococci it was found that the rate at which the streptococci disappeared from the blood was even less

TABLE 16
Change in Percentage of Tissue Response to Subcutaneous Injections of Streptococci in Hypersensitive Animals following Intravenous Vaccination (*B. typhosus*)

NO.	NOT VACCINATED	VACCINATED
1	10 per cent	10 per cent
2	6	8
3	9	10
4	8	5
5	10	8
6	8	5
7	10	10
8	10	10
9	8	6
10	9	10
	88 per cent	82 per cent
Average Agglutination Titers		
NOT VACCINATED		1:3200
VACCINATED:		
Streptococcus		1:4000
B typhosus		1:6400

than in normal animals (table 17). Protection against streptococci was not brought about by intravenous vaccination with *B. typhosus*.

It can be concluded on fairly good experimental grounds that streptococcic desensitization and protection are species specific but not type specific and that they are not brought about by a non-specific protein reaction.

The above findings and experiments supply the following conclusions as a basis for intravenous streptococcic vaccination in chronic arthritis:

1. Non-specific chronic arthritis in most cases appears to be due to a

streptococcic infection (not a specific strain).

2. Subcutaneous injections of a streptococcic vaccine do not desensitize the hypersensitive individual but tend to increase the hypersensitive state.

3. The subcutaneous method develops only a slight degree of protection.

4. The intravenous method of giving a streptococcic vaccine desensitizes the hypersensitive patient, does not develop hypersensitiveness, and does cause a high degree of protective immunity to be developed.

TABLE 17

Organisms per Cubic Centimeter Alive in the Blood 15 Minutes After Injecting 50,000,000 Streptococci Intravenously into Normal Animals and Animals Made Immune to *B. Typhosus*

NORMAL		IMMUNE TO B. TYPHOSIS	
AGGLUTINATION TITER	NO. PER C.C.	AGGLUTINATION TITER	NO. PER C.C.
1:50	55	Ty. 1:100,000 St. 1:200	75
1:50	40	Ty. 1:100,000 St. 1:200	55
1:50	40	Ty. 1:100,000 St. 1:200	75
1:800	41	Ty. 1:200,000 St. 1:200	60
1:0	18	Ty. 1:400,000 St. 1:0	32
1:50	30	Ty. 1:100,000 St. 1:200	87
1:100	40	Ty. 1:50,000 St. 1:400	40
1:0	21	Ty. 1:100,000 St. 1:200	41
1:200	21	Ty. 1:100,000 St. 1:100	15
1:100	40	Ty. 1:50,000 St. 1:200	50
	346 1		530 1.5

5. Neither the desensitizing nor the protective phenomena are type specific but they appear to be species specific. They are not of the nature of a non-specific protein reaction.

These conclusions were the basis of the experiments in the intravenous vaccine therapy in 301 cases of chronic arthritis reported in this paper.

SUMMARY OF RESULTS

Three hundred and one cases of chronic arthritis have received five or more intravenous injections at weekly intervals. The organism used in the vaccine was from a case of acute rheumatic fever and had been cultured for nine years, was of low virulence, did not agglutinate spontaneously, and was safe for intravenous injections. Cross agglutination occurred in high dilutions (1:50,000) with many other strains of both acute rheumatic and chronic arthritic origins.

Dose. The initial dose was 100 million organisms. This was increased by 100 million organisms at weekly injections. As a rule not more than eight to ten injections were given.

Reactions. Slight reactions with temperature and chills occurred in

about 50 per cent of the cases. The degree of reaction seemed to have no relation to the clinical improvement.

Number of Injections Necessary for Clinical Improvement. Nearly two-thirds of the patients experiencing improvement did so after five injections, nine-tenths did so after seven injections. There were very few cases in which improvement took place, if it had not occurred with eight to ten injections (table 18).

Agglutination Titers and Vaccine Therapy. The greatest percentage of untreated patients showed an agglutination titer of 1:200 with the strain of streptococcus used in the vaccine. The intravenous vaccine therapy stimulated a definite rise in the agglutination titers in the serums of most of the patients. Clinical improvement occurred most frequently when the titer was 1:6400 or more (table 19). The height of the streptococcic agglutination titer seemed to be a reliable indicator in most instances of the protection possessed by the patient against streptococci.

Results. Determination of clinical improvement was based on three criteria: (1) decrease in pain, (2) decrease in joint swelling, and (3) increase in joint movement.

TABLE 18
Time of Beginning Definite Improvement

NUMBER OF TREATMENTS	1	2	3	4	5	6	7	8	9	10	Over 10
NUMBER IMPROVED	13	39	46	47	34	18	13	8	11	2	2
PERCENTAGE IMPROVED	5.6	16.7	19.7	20.2	14.5	7.7	5.7	3.4	4.7	1.3	1.3
TOTAL PERCENTAGE IMPROVED	5.6	22.3	42.0	62.2	76.7	84.5	90.2	93.6	97.4	98.7	100

TABLE 19
Distribution of Maximum Agglutination Titer in 188 Improved Treated Arthritic Patients

TITER	1:800	1:1600	1:3200	1:6400	1:12800	1:25000	1:50000	1:100000
NUMBER	4	9	27	54	71	20	3	0
PERCENTAGE	2.1	4.7	14.3	28.8	37.8	10.6	1.7	

TABLE 20
Results of Therapy (301 cases)

	NUMBER OF CASES	PER CENT
Definite clinical improvement	233	74.4
Questionable improvement	19	6.3
No improvement	49	16.3

Excluding the 19 questionable cases the results for the different criteria for improvement are tabulated as follows:

Definite clinical improvement was observed in 80 per cent of the cases treated.

DISCUSSION

An experimental basis for intravenous streptococcic vaccination in chronic arthritis and the results of such vaccination in 301 patients are discussed in this paper.

Streptococcic vaccination seems to be indicated because chronic arthritis appears to be due to a streptococcic infection. The things to be considered as evidence for the etiology of chronic arthritis are: (1) Streptococci have been recovered from the blood, joints, lymphnodes, and subcutaneous nodules from a relatively high percentage of cases of chronic arthritis. (2) A high percentage of patients having chronic arthritis are found by the skin test to

be hypersensitive (allergic) to streptococci. (3) The streptococcic agglutination titer is higher in patients with chronic arthritis than in normal persons. (4) The cellular reactions in lesions in chronic arthritis are similar to those of known origin, such as acute rheumatic fever and subacute bacterial endocarditis.

The intravenous method of administering the vaccine is indicated rather than the subcutaneous method for the following reasons: (1) The intravenous method does not produce hypersensitiveness, as does the subcutaneous method, but desensitizes the patient who is already hypersensitive to streptococcic protein. (2) Subcutaneous injections of streptococci produce only a slight degree of protection, while the intravenous method results in a high resistance.

An autogenous vaccine does not seem to be necessary since both the desensitizing and protective phenomena seem

TABLE 21

	NUMBER OF CASES	PER CENT
1. Joint pain (282 cases)		
Decreased pain	233	82.6
Unchanged	49	17.4
2. Joint swelling (197 cases)		
Decreased swelling	160	81.2
Unchanged	37	18.8
3. Joint motion		
Increased motion	206	84.7
Unchanged	37	15.3

to be species (group) specific rather than type (strain) specific.

The use of intravenous injections of *B. typhosus* in treating chronic arthritis is contraindicated, since such injections do not desensitize patients hypersensitive to streptococci and do not cause the development of a protective immunity in the patient against streptococci.

Intravenous injections of streptococci can safely be administered to patients. Such injections in our series of 301 patients have resulted in definite clinical improvement in about 80 per cent of the cases.

The streptococcic agglutination titer of the serums of these patients appears to be a reliable indicator in most cases of the protection possessed by the patient against streptococci.

These experiments have not been in effect long enough to draw definite conclusions concerning the duration of the clinical improvement. In a few cases the clinical improvement and a high agglutination titer have been sustained for as long as eight months.

CONCLUSIONS

1. Intravenous streptococcic vaccination seems to meet the demand of a method of vaccination for chronic arthritis in not increasing hypersensitiveness, in desensitizing the already hypersensitive individual, and in producing a high protective immunity against streptococci.

2. The subcutaneous method seems to be contraindicated, since it tends to increase hypersensitiveness, does not bring about a state of desensitization, and produces only a low degree of protection.

3. The intravenous injection of *B. typhosus* in treating chronic arthritis would seem to be contraindicated.

4. About 80 per cent of the patients with chronic arthritis who received five or more intravenous injections of a streptococcic vaccine showed definite clinical improvement.

5. The results obtained in treating patients with chronic arthritis by intravenous streptococcic vaccination seem to justify the further study of such treatment.

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Hypertension and Diabetes*†

By HENRY J. JOHN, M.D., F.A.C.P., *Cleveland, Ohio.*

THAT the blood pressure rises as a result of increase in weight in non-diabetic individuals has been shown by various authors.^{2, 14, 15, 16, 17, 18, 41} One striking example of this relationship is shown in the data reported by Hartman and Ghris² of the Mayo Clinic, who in 1922 analyzed a series of 2,042 consecutive cases of this type which were seen there. The males and females were practically equally divided. The summary of this study may be expressed by the following:

Blood pressure in the total number of cases of underweight (male)	125.1
Blood pressure in the total number of cases of overweight (male)	141.2
	(12.88 per cent)
Blood pressure in the total number of cases of underweight (female)	127.2
Blood pressure in the total number of cases of overweight (female)	142.2
	(11.81 per cent)

Observations by Terry¹⁷ and Rose¹⁸ showed that in patients presenting hypertension with obesity, merely the reduction of their weight brought about also a decrease in their blood pressure. Therefore, obesity may be looked upon as one of the etiological factors in the production of hypertension in non-diabetics.

If overweight is an important factor in hypertension how does the group of patients afflicted with diabetes stand

in relation to overweight? Such information should give us one of the clues to a further analysis of this question. In 1930, I¹⁹ published a study of a series of 528 cases of diabetes studied from the standpoint of weight at the time I saw them for the first time or at any time of their life. The following data were obtained from this study:

Normal weight (below normal and up to plus 10 per cent above normal) in 24 per cent.
Overweight (above 10 per cent) in 76 per cent.

It is evident then, that overweight is a definite factor in diabetes.¹⁹ The distribution of overweight in the various decades compared with normal weight is shown in chart I.

The weight factor is of course only one of the links in the chain of hypertension, but it is a significant one. The immediate causes of hypertension are still sufficiently uncertain to warrant a new hypothesis, for many causative factors have been suggested. For a brief review we may consider the following possible causes of hypertension: (1) arteriosclerosis in diabetes,^{24, 26, 27} (2) increase in cholesterol

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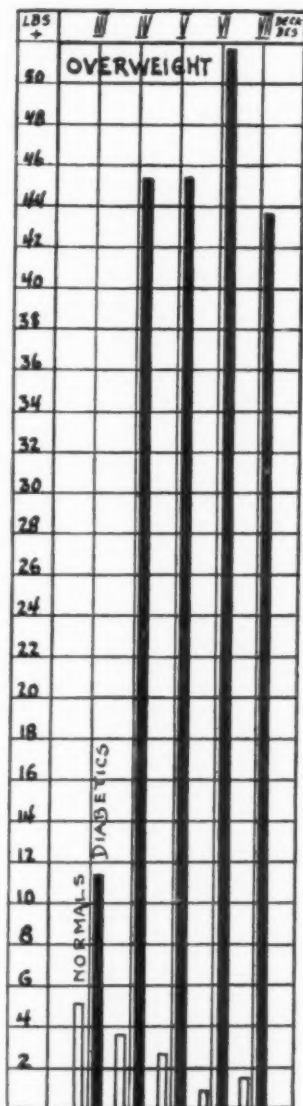


CHART I. The distribution of overweight in pounds in the author's series of 528 cases of diabetes arranged according to decades.

in circulating blood,^{24, 25, 29, 60, 64 65, 66, 67} (3) blood peptides,²⁸ (4) anemia of brain,^{30, 38, 39, 40} (5) hyperglycemia,^{31, 32, 34, 35, 37} (6) insulin administration,³³ (7) hyperthyroidism, (8) kidney disease,³⁶ (9) heredity,^{42, 63} (10)

syphilis,⁴² (11) infections,^{44, 63} (12) high protein in diet,^{45, 46, 47, 68} (13) pressor effect of guanidine bases,^{48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59} (14) lowered calcium content,^{61, 62} (15) toxemia of pregnancy,⁶³ (16) mental and physical strain,⁶³ (17) disturbance of the acid-base balance.⁶⁸ Adams⁵ states that in 90 per cent of the cases of diabetes discussed in his paper (1,001 cases) the patients were more than 10 per cent overweight at some time before the onset of diabetes; 54 per cent were still overweight after having had diabetes for varying lengths of time. In this same series Adams points out that 16.2 per cent of the male diabetics had a systolic blood pressure of more than 150 mm. as against 2.4 per cent of Exton's normal males; 26.7 per cent of the female diabetics had a systolic pressure of more than 150 mm. as against 4.3 per cent of Exton's normal females. This is offset by the fact that in Adams' cases 15.6 per cent of male diabetics had a blood pressure lower than 110 mm. as against 2.5 per cent of Exton's normal men, and 19 per cent of diabetic women had a systolic pressure of less than 110 mm. as against 8.1 per cent of Exton's normal women. The apparent contradiction, Adams says, may be explained by the wide "scatter" of the blood pressure readings in diabetic patients as compared with the narrow scatter of blood pressure readings of normal persons.

The summary of Adams' study is shown in charts II and III. Chart II shows the blood pressure in all cases of diabetes as compared with that in a series of normals. Chart III shows the blood pressure in cases in which only diabetic patients who are free from

nephritis, arteriosclerosis and hyperthyroidism, are shown together with the normal series. He concludes that there is no appreciable increase of blood pressure in the diabetics over that of non-diabetics.

The range of opinion as to whether blood pressure is increased in the presence of diabetes can be noted from table I, in which I have tried to summarize the opinions of various authors on the subject. The consensus of opinion would seem to indicate that the blood pressure is increased in the presence of diabetes.

My own studies comprise observations on 1,828 cases of diabetes mellitus. Of this group 1,385 cases are of diabetes mellitus and 443 are cases of diabetes mellitus associated with hyperthyroidism. Observations on blood pressures in diabetes, arranged according to decades, according to distribution between male and female are summarized in table 2. Throughout this study I have divided these observations arbitrarily into two groups: (1) cases in which the blood pressure has not exceeded 140 mm. and (2) those in which the blood pressure is above 140

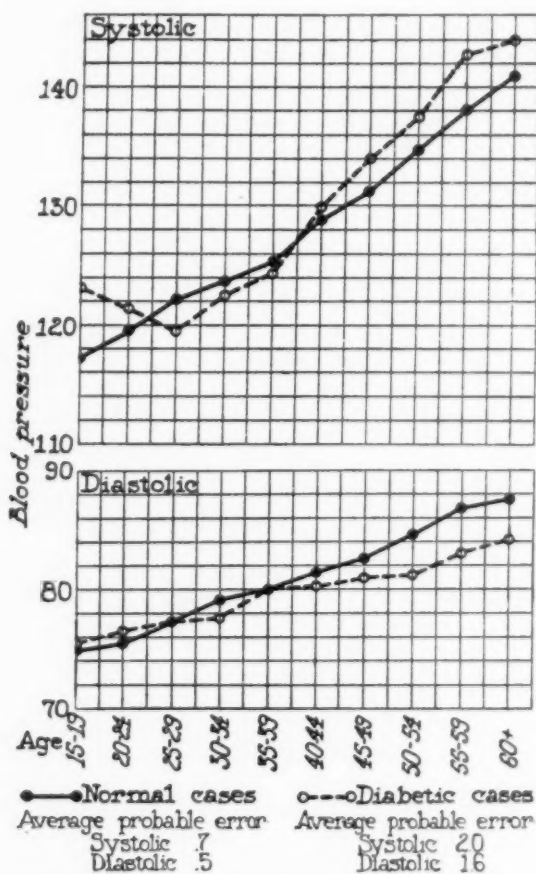


CHART II. A comparison of the blood pressure of diabetic patients with the normal blood pressure. (Adams⁶)

mm. Details in regard to each group are given in each descriptive chart or table. It will be noted that the males and females were equally divided. Of the entire group, 54.3 per cent presented a blood pressure under 140 mm. and 45.7 per cent had a blood pressure above 140. When we compare these data with the observations on non-diabetics furnished by Wiechmann⁴ as I have done in table 3, it will be seen in decades below and including the fourth the blood pressure is virtually the same in non-diabetics as it is in diabetics, while above this age the incidence of high blood pressure is greater in diabetics.

In order to further analyze the incidence of hypertension in non-diabetics I grouped a series of 11,840 cases from data furnished by Weitz, Gellman, Soller, Keith et al., Riseman and Weiss, Frost, Dublin, Fisk-Kopf, and Rogers-Hunter. The results of this analysis are presented in chart IV. It will be noted that the considerable increase in the incidence of hypertension begins with the fourth decade, and is greatest in the sixth decade after which it again declines.

Chart V shows a series of observations on my own cases in which the variation of blood pressure in various diseases is noted. A summary of the

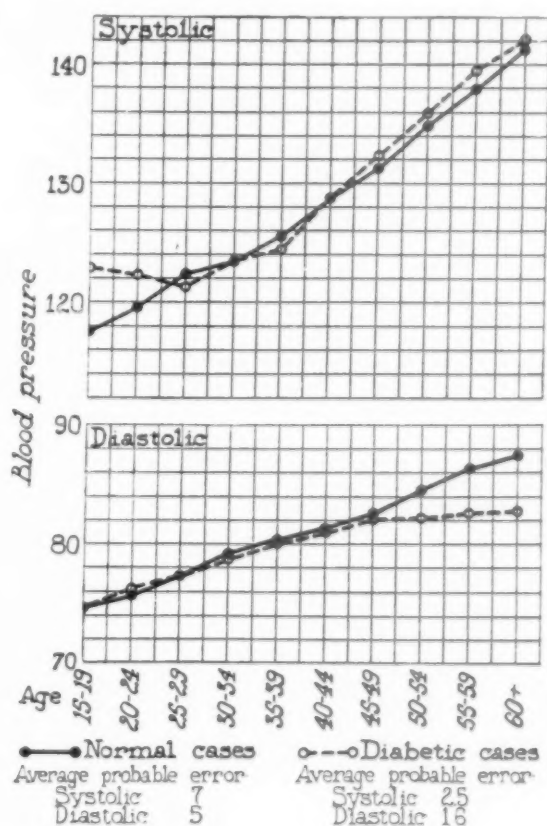


CHART III. The blood pressure of diabetic patients free from nephritis, arteriosclerosis or hyperthyroidism, compared with normal blood pressures. (Adams⁵)

TABLE 1A

Observations by Various Authors in Regard to Blood Pressure in Diabetes Mellitus

AUTHOR	YEAR PUBL.	INCREASED	BLOOD PRESSURE	
			NORMAL	DECREASED
Adams ⁵	1929		*	
Koopman ⁶	1924	*		
Hitzenberger ⁷	1921	**	*	
Kylin ⁸	1921	**	*	
Katz-Klein ⁹	1924	*	*	
Peterson ¹⁰	1929	**	*	
Kramer ¹¹	1928	*		
Rosenbloom ¹²	1922	*	*	*
Elliott ¹³	1907		*	*
Larsen ²⁰	1929	*		
Kahn ²⁴	1921			*
Maranon ²¹	1922	*	*	
Riesman ¹⁰²	1919	*		
Hitzenberger ²²	1921	*		
Kylin ²³	1922	*		
Herrick ³⁵	1923	*	*	
Janeway ⁸²	1915	*	*	
Wiechmann ³⁷	1928	*		
von Noorden and Isaac ⁷⁸	1927	*		
Elliott ⁸³	1907		*	
Maranon ⁷⁹	1922	*		
Wiechmann ⁹⁶	1928	*		
Hitzenberger ⁸⁰	1921	*		
Joslin ⁸¹	1928	*		
Peiser ⁷⁵	1930	*		
John (present publ.)	1931	*		

TABLE 1B

Observations of Various Authors in Regard to Blood Pressure in Non-Diabetics

AUTHOR	YEAR OF PUBL.	BLOOD PRESSURE		
		INCREASED	NORMAL	
Faber ¹⁴	1927	*		(1000 normal children increased weight)
Symonds ¹⁵	1923	*		(150,419 normals with increased weight)
Huber ¹⁶	1927	**	*	(12000 army officers, normals)
Terry ¹⁷	1923	**	*	(Obese, non-diabetic, 58 per cent hypertension)
Rose ¹⁸	1922	**	*	(Normals, B. P. reduced by reducing weight)
Hartman and Ghrist ²	1929	*		(Normals with increased weight)

TABLE 2
Blood Pressure in Diabetes (John)

DECADE		TO 120	121 130	131 140	141 150	151 160	161 170	171 180	181 190	191 200	201 250	251	TOTAL	MALE	FEMALE
I	M	2											2	2	
	F	1											1		1
II	M	11	1										12	12	
	F	10	1										11		11
III	M	25	6	3	1	2							37	37	
	F	31	9	3	1	4	1		1				50		50
IV	M	55	20	9	4	2		1		1	1		93	93	
	F	29	25	15	10	5	2	2	1	1	6	2	98		98
V	M	67	23	19	14	6	5	3	2	2	4	1	146	146	
	F	25	19	22	30	15	15	13	8	5	9	2	163		163
VI	M	48	42	23	21	18	14	9	5	4	5	2	192	192	
	F	28	17	28	36	21	21	31	19	11	20	1	233		233
VII	M	23	19	22	22	16	15	9	11	6	13	1	157	157	
	F	11	14	11	15	12	11	10	7	5	11		107		107
VIII	M	12	8	6	10	7	4	2	3		1		53	53	
	F	4	2	3	2	2	6	1	4	1	3	2	30		30
Total		382	206	164	167	110	94	81	61	36	73	11	1385	692	693
Per cent		752—54.3%			633—45.7%									50%	50%

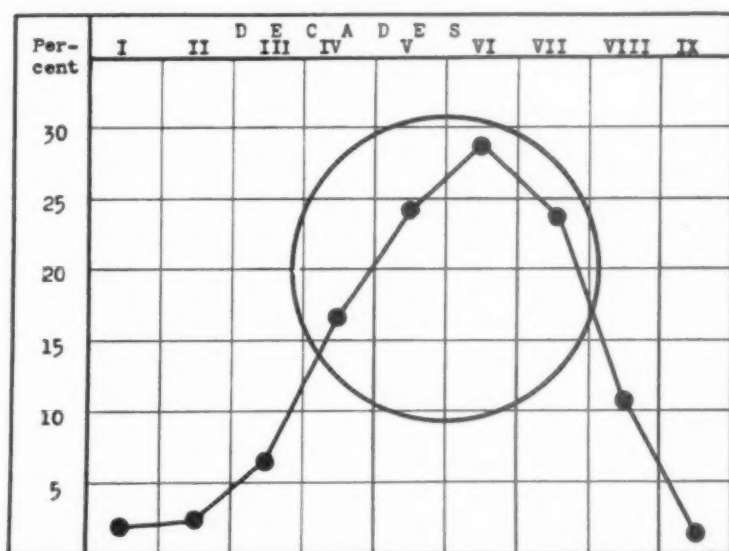


CHART IV. The average incidence of hypertension in non-diabetics classified as to the different decades. A compilation from the literature of 11,840 cases by Weitz, Gelmann, Zoller, Keith et al, Riseman and Weiss, Frost, Dublin-Fisk-Kopf, Rogers-Hunter.

TABLE 3
Blood Pressure in Diabetes, in Diabetes-Hyperthyroidism and in Normals

AGE	BELOW 30 YEARS			31-40 YEARS			41-50 YEARS			51-60 YEARS			61-70 YEARS			71-80 YEARS		
BLOOD PRESSURE	NORMAL—PERCENT	DIABETIC—PERCENT (W)	DIABETIC—PERCENT (J)	NORMAL—PERCENT	DIABETES—PERCENT (W)	DIABETES—PERCENT (J)	NORMAL—PERCENT	DIABETES—PERCENT (W)	DIABETES—PERCENT (J)	NORMAL—PERCENT	DIABETES—PERCENT (W)	DIABETES—PERCENT (J)	NORMAL—PERCENT	DIABETES—PERCENT (W)	DIABETES—PERCENT (J)	NORMAL—PERCENT	DIABETES—PERCENT (W)	DIABETES—PERCENT (J)
MALES	197	27	51	8	107	13	93	19	33	96	48	192	31	57	23	157	8	53
	15	26	74	26	17	38	60	11	25	10	2	25	16	5			12	
	80	67	19	37	76	56	32	47	36	60	44	34	36	54	38	26	24	26
	5	7	7	25	6	6	6	37	16	20	20	20	38	24	33	24	24	41
				12	1		1	5		10	26	17	10	17	22	26	38	17
Above 200							1		1	6	3	3			7	9	12	2
	171	13	62	35	50	5	98	53	51	18	163	108	60	33	233	102	39	14
70-109	20	23	68	26	22		30	25	4	10	15	5	8	9	12	3	2	11
110-140	76	77	20	40	75	80	40	28	70	40	25	27	55	28	19	20	26	30
141-160	4		9	35	3		16	26	19	10	28	30	30	18	25	27	37	29
161-200			3	9		20	6	15	7	40	25	34	7	36	35	35	20	13
Above 200							8	6				7	4	9	9	15	15	29
																	9	17
																	18	40
																	28	40
																	13	20
																	18	13
																	29	17
																	36	13
																	42	20
																	59	40
																	13	40
																	29	17

(J)—John (present series)

(W)—E. Wiechmann (Munch. med. Wchnschr., 1929, lxxvi, 98-101.)

TABLE 4
Blood Pressure in Hyperthyroidism and Diabetes (John)

DECADE		TO 120	121 130	131 140	141 150	151 160	161 170	171 180	181 190	191 200	201 250	251	TOTAL	MALE	FEMALE
I	M														
	F														
II	M														
	F	1	1	3	1	1							7		7
III	M	2	1	2	2		1						8	8	
	F	8	3	4	6	4	1	2					28		28
IV	M	2	4	5	4	3		1					19	19	
	F	13	8	7	9	5	1	2	5		3		53		53
V	M	8	9	3	3	6	1	2			1		33	33	
	F	6	15	15	18	14	16	5	9	6	4		108		108
VI	M	5	7	4	8	4	1		2				31	31	
	F	4	8	12	16	11	8	12	9	6	14	2	102		102
VII	M	1		2		2	1	1		1			8	8	
	F	1	2		5	5	5	10	5	2	3		38		38
VIII	M							2	1				3	3	
	F			1			1	1			2		5		5
Total		51	58	58	72	55	36	37	32	15	27	2	443	102	341
Per cent		167-37.6%			276-62.4%									23%	77%

results of observations of cases of diabetes associated with hyperthyroidism (as shown in table 4), is given below in comparison with the results of observations on cases of diabetes. It will be noted that there is a definite increase in the incidence of hypertension in the latter, and also that three-fourths of these patients are females.

A study of these two relationships analyzed from a somewhat different angle, namely, that of dividing each of these groups into cases up to 30 years of age and above this age, as shown in table 5, shows that in the group of

young diabetics hypertension is present in only nine per cent as contrasted with an incidence of hypertension in 42 per cent of cases of diabetes with hyperthyroidism. In diabetes, then, increase in blood pressure begins later in life, whereas if diabetes is complicated with hyperthyroidism such a rise occurs early in more than 50 per cent of cases.

Kramer,¹¹ who analyzed 500 cases of diabetes and compared these with non-diabetics, found that 38 per cent have hypertension, that is, a blood pressure above 150 mm.

	FEMALE PER CENT	BLOOD PRESSURE BELOW 140 MM. PER CENT	BLOOD PRESSURE ABOVE 140 MM. PER CENT
Diabetes	50	54.3	45.7
Diabetes and hyper thyro	77	37.6	62.4

THE RELATION OF HYPERGLYCEMIA TO HYPERTENSION

In 1910 Neubauer⁷⁶ noted the occurrence of hypertension associated with hyperglycemia and offered the theory that the excessive activity of the suprarenals might be the underlying factor. The question naturally arises—why should there be an excessive activity of the adrenals in old age? Even granting that the activity of the islands is lessened, due to arteriosclerosis or at any rate to a diminished blood supply, or to any other cause which might alter a normal activity of the adrenals thus bringing about hyperglycemia—yet the idea of an increase in the activity of the adrenal glands in old age does not seem logical. O'Hare⁷⁰ also noted the fact that there is a decline in tolerance for carbohydrates in *certain* examples of high blood pressure. He wrote "certain examples"—which indicates a general observation. Were the increase in blood pressure, *per se*, the only factor then we should find a decrease in tolerance for carbohydrates in all cases of progressively increasing blood pressure. He offered the explanation that sclerosis of the arteries of the pancreas might be the pathologic background for this condition. He

thinks that these cases are potential diabetic cases and need observation. On the other hand, Pearce and Keith⁷⁷ suggested that because a diseased kidney is unable to utilize the ordinary amount of sugar brought to it by the blood, a diminished sugar consumption results, together with increased accumulation of this substance in the blood stream. When one considers the total weight of the kidneys in relation to the weight of the rest of the body, it hardly seems possible that this would be the answer. Furthermore, when I think of the hun-

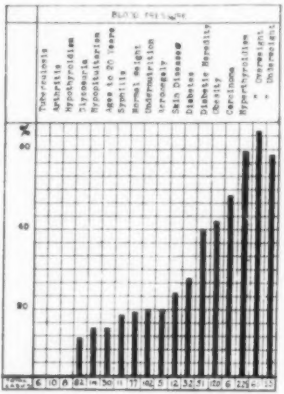


CHART V. Chart showing the percentages of the cases in which the blood pressure was above 140 mm. among the various groups classified according to affection. (John)

TABLE 5

Study of Hypertension in Diabetes and Diabetes with Hyperthyroidism, the Cases Being Divided into Two Age Groups: Those up to 30 and Those above 30 years of Age (John)

		DIABETES		DIABETES AND HYPERTHYROIDISM	
		NO. CASES	PER CENT	NO. CASES	PER CENT
AGE (years)	BLOOD PRESSURE				
1-30	Below 140	103	91	25	58
	Above 140	10	9	18	42
31-90	Below 140	647	51	141	35
	Above 140	621	49	258	65

dreds of renal conditions ranging from the mildest to the most severe, with but little kidney substance left functioning these patients meanwhile presenting repeatedly a normal blood sugar level, I feel quite strongly that diseased kidneys alone will not cause an appreciable rise in blood sugar. Meyers and Killian⁷³ noted an increase in the diastatic activity of the blood in examples of nephritis and expressed the idea that this might account for the hyperglycemia often noted in such cases. Härle,³⁶ in a study of a series of cases of hypertension, failed to discover any exact parallelism in the curves of blood pressure and blood sugar. He concluded that hypertension and hyperglycemia are not the common results of increased activity of the chromaffin system. Botti¹⁰³ stated that in the presence of hypertension the blood sugar is increased and the sugar tolerance lessened. Kylin⁸ has also described the association of lowered carbohydrate tolerance with hypertension. Herrick⁷¹ was led to believe from his personal observations that the occurrence of high blood pressure and increased concentration of glucose in the blood is present in a definite group of cases characterized by four cardinal symptoms: hypertension, hyperglycemia, obesity and arteriosclerosis. Mohler⁷² studied 46 patients varying in age from 30 years to 70 years with glycosuria and a blood pressure of 150 or more. Forty-five of the 46 patients ranged from 1 to 60 per cent overweight at the time of the observation, 36 of these weighing more than 200 pounds at some period of life. In 16 of these 36 patients, diabetes had developed. Mohler³ concluded that obesity frequently is a factor in the development

of sclerotic changes in the body which are capable of producing an increase in the blood pressure and a diminished ability of the body cells to utilize carbohydrate. Interesting are the studies of Hoppe-Seyler⁸⁴ and Herxheimer⁸⁵ who pointed out that in cases in which arteriosclerosis of the kidneys and hypertension are present, diabetes begins through an analogous arteriosclerosis of the pancreas. To this observation Wiechmann⁹⁶ added that a certain natural weakness of the pancreas may be a causative factor.

Tachau⁷⁴ and Härle³⁶ both found blood sugar values in nephritis with hypertension at the upper limits of the normal. In hypertension without clinically recognizable renal changes or other complications they found not only high blood sugar values but often definite hyperglycemia. Hitzemberger and Richter-Quittner²² found hyperglycemia present in all cases of vascular hypertension. Frank,⁶⁹ Billigheimer,⁸⁰ Kahler,⁸⁷ Petré,⁸⁸ Peiser,⁸⁹ Voegelin,⁹⁰ always found normal blood sugar values in hypertension or at least values that lie at the upper limits of normal.

In table 6 I have summarized the average blood sugar values given by seven different authors; these all fall within normal levels. In table 7 I have summarized further the conclusions of all the authors cited in this section on the relation of hypertension to hyperglycemia. Archer,² who studied a series of 20 typical cases of arthritis of the menopause, found in 70 per cent a diminished sugar tolerance in contrast to only 15 per cent in a parallel series of infectious cases. Of these 70 per cent of diminished sugar tolerance, 71 per cent had an associated hypertension or obesity or both.

TABLE 6
Average Blood Sugar Values in Hypertension (As Reported by Various Authors)

AUTHOR	YEAR	AVERAGE BLOOD SUGAR VALUE
Ryser ⁹² (Compiled from authors)	1916	87
Gettler and Backer ⁹³ (Compiled from 12 authors)	1916	91
Epstein and Aschner ⁹⁴	1916	96
Staub ⁹⁵	1921	96
Wiechmann ⁹¹	1924	96
von Noorden ⁷⁸	1927	85
Wiechmann ⁹⁶	1928	114

TABLE 7
Opinion of Authors on Hyperglycemia in Hypertension

AUTHOR	YEAR	NORMAL	INCREASED
Frank ⁶⁹	1911	*	
Billigheimer ⁸⁶	1921	*	
Kahler ⁸⁷	1922	*	
Petrén ⁸⁸	1927	*	
Peiser ⁸⁹	1927	*	
Voegelin ⁹⁰	1927		
Wiechmann ⁹¹	1924	*	*
von Noorden ⁷⁸	1927	*	
Ryser ⁹²	1916	*	
Gettler and Backer ⁹³	1916	*	
Epstein and Aschner ⁹⁴	1916	*	
Staub ⁹⁵	1921	*	
Wiechmann ⁹⁶	1928	*	*
Neubauer ⁷⁶	1910		*
O'Hare ⁷⁰	1920		*
Pearce and Keith ⁷⁷			*
Mohler ⁷²	1925		*
Seyler ⁸⁴	1904		*
Herxheimer ⁸⁵	1927		*
Tachau ⁷⁴	1911	*	
Härle ⁸⁸	1921	*	
Hitzenberger et al ²²	1921		*
Myers and Killian ⁷³		*	
Kylin ⁸	1921		*
Herrick ⁷¹	1923	*	*
		16	12

Table 8 presents the summary of my own observations of 50 uncomplicated cases of hypertension, based on glucose tolerance tests, and classified according to decades. It will be seen that in the earlier decades the incidence of diabetic curves is zero, whereas in the fifth decade and up the diabetic incidence rises rapidly. This fact is also demonstrated in chart VI which shows

the rapidly increasing incidence with advanced years. This observation is in line with the pathological observations of Herxheimer,⁸⁵ Fahr,⁹⁷ Aschoff,⁹⁸ Seyfarth,⁹⁹ and others who have shown that in hypertension, it is not only the renal arterioles which are affected first and most but the pancreas also shows changes of arteriosclerosis when the arterioles of the rest of the body

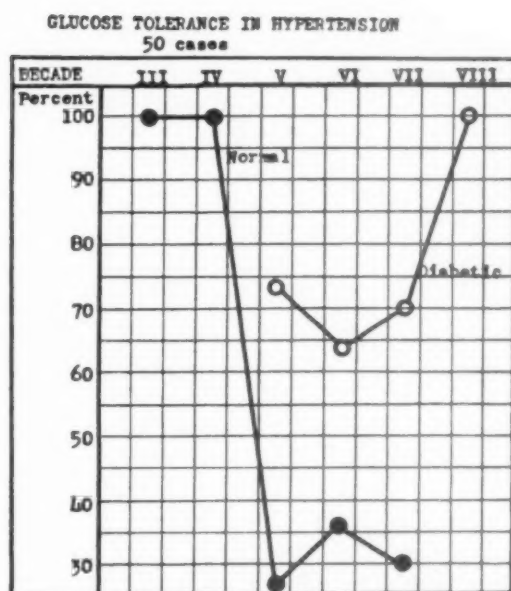


CHART VI. Glucose tolerance in 50 cases of hypertension.

TABLE 8

Analysis of Fifty Glucose Tolerance Tests in Hypertension According to Decades (John)

DECADE	NORMAL CURVES	PER CENT	DIABETIC CURVES	PER CENT
III	2	100		
IV	7	100		
V	4	27	11	73
VI	5	36	9	64
VII	3	30	7	70
VIII			2	100
Total	21	42	29	58

are not affected with any regularity. Herxheimer pointed out that in cases in which arteriosclerosis of the kidneys and high blood pressure are present, the pancreatic blood vessel changes and the resultant changes in the islands are secondary. Fraenkel¹⁰⁰ stated: "These changes [pancreas, especially the cells of the islands] will be found in such boundaries as the various pathological changes of the blood vessels, from the beginning of the spasm, then through the angioneurosis on up to arteriosclerosis." Wiechmann⁹⁶ clearly stated:

"Just as nephrocirrhosis arteriosclerotic can be the cause for increased blood pressure, so can the cirrhosis arteriosclerotic of the pancreas (Herxheimer) be the cause for the changes of the carbohydrate metabolism. We must also note that often we are dealing only with functional changes which lead to similar clinical results as morphological changes. Just as the high blood pressure can be but functional, so also do we find functional changes in the blood vessels of the pancreas which lead to hyperglycemia

and other changes in the carbohydrate metabolism."

In my series of 50 cases of hypertension, glycosuria was present in 18 cases or 36 per cent. (See table 9.) Glycosuria was present six times in the presence of normal glucose tolerance curves (39 per cent), and it was absent sixteen times in diabetic curves (55 per cent). This leads us to the evaluation of the renal threshold which can be estimated fairly closely from a

ades. Also, one finds in cases of hypertension changes in blood sugar which are characteristic of diabetes mellitus. The type of hypertension is the same in both and whether we are dealing with a functional hypertension or an anatomic hypertension the blood sugar pictures in both are similar.

Many of the workers in this field look upon these changes in a large number of cases of hypertension as a latent diabetes,^{1, 85, 91, 97, 98, 99} a predi-

TABLE 9
Glycosuria in Fifty Cases of Hypertension (John)

GLUCOSE TOLERANCE CURVE	GLYCOSURIA	PER CENT	NO GLYCOSURIA	PER CENT
Normal	6	39	15	71
Diabetic	13	45	16	55

	NO. CASES	DIABETIC PER CENT	NON-DIABETIC PER CENT
Glycosuria	19	66	33
No Glycosuria	31	52	48

glucose tolerance test. Table 10 shows that 47 per cent of these cases have a renal threshold above 180, which is high. In my previous publication¹⁰¹ the average renal threshold for hypertension cases was also high, namely 165. (The average ranges were from 110 to 216.)

TABLE 10
Renal Threshold in Hypertension (John)

Below 140 mg./100 c.c.	23%
141 to 180 mg./100 c.c.	30%
181 to 200 mg./100 c.c.	33%
201 to 250 mg./100 c.c.	14%

From the previous consideration, then, it seems that there is a close connection between hypertension and hyperglycemia which in turn means diabetes either functional or anatomic. Hypertension occurs more frequently in diabetics, especially in the later dec-

abetic stage. A prediabetic stage does not necessarily come to the foreground and develop into a full fledged diabetes. I have various groups of cases of latent diabetes and I keep them in this stage merely by a slight regulation of their diet, by a close observation of their weight, and by seeing that these patients get plenty of exercise. There are also many observations of the opposite nature, namely—a prediabetic stage—a disregard of any diet—the development of obesity—diabetes. This is a natural sequence in the evolution of diabetes in such a group. Many of these cases of hypertension also die early which is another factor in eliminating a certain number of diabetics from our records.

THE RELATION OF OVERWEIGHT AND UNDERWEIGHT TO BLOOD PRESSURE IN DIABETES MELLITUS AND DIABETES WITH HYPERTHYROIDISM

This study is based on observations of a total of 1,051 cases. Of these, 614 were cases of diabetes mellitus (292 male and 322 female) and 186 were cases of diabetes with hyperthyroidism (46 male and 140 female). A brief summary of the rise of blood pressure incidence reported by various authors can be gleaned from table 11. Tables 12 and 13 show a detailed analysis of these two groups of cases which I am reporting classified according to per cent of overweight, the increase in blood pressure and the distribution of male and female cases. Table 14 presents a similar analysis of the cases of underweight (in this group are included normal weights, up to plus 10 per cent above normal, and all cases below normal), cases of diabetes and cases of diabetes with hyperthyroidism. The data offered in table 12 are graphically expressed in chart VII in which it is clearly shown that in 50 per cent

of the cases of diabetes the blood pressure is above 140, and in 50 per cent the blood pressure is below 140. With increase in weight there is a decided increase in blood pressure. The data offered in table 13 (Diabetes and Hyperthyroidism) are graphically expressed in chart VIII. Here we find that in 66 per cent of these cases the blood pressure is above 140 and in only 34 per cent is the blood pressure below 140. Here we do not find the orderly sequence of increase in blood pressure with increase of weight, for other factors in addition to overweight enter into this picture.

Table 15 presents a detailed comparative analysis of blood pressure studies in overweight and underweight. These data are graphically expressed in chart IX which shows the increasing incidence of high blood pressure in per cent in overweight diabetics and a similar, although not as marked, increase in the incidence of high blood pressure in the presence of diabetes associated with hyperthyroidism.

Chart X presents a general summary

TABLE 11
Blood Pressure in Diabetes According to Various Authors

AUTHOR	AGE	BLOOD PRESSURE	PER CENT
von Noorden and Isaac ⁷⁸	1-50	above 140	30
	51-90	above 140	65
Kylin ⁸	40-90	above 140	88
	40-90	above 160	72
	40-90	above 180	48
Hitzenberger ⁸⁰	40-90	above 140	64
	40-90	above 180	33
Joslin ⁸¹	21-50	above 150	58
	51-90	above 150	68
Kramer ¹¹ 500 cases	to 30	above 140	4.6
	31-80	above 140	51
John (present publ.) 1385 cases	to 30	above 140	9
	31-90	above 140	49

TABLE 12
Relation of Overweight to Various Levels of Blood Pressure in Diabetes (John)

BLOOD PRESSURE		120	140	160	180	200	220	240	260	280	300	TOTAL	INCIDENCE PER CENT	
													BELOW 140	ABOVE 140
Overweight Per cent 10	male	30	19	16	5	3	1	1				75		
	female	19	14	12	3	4	2	1	1			56		
	Total	49	33	28	8	7	3	2	1			131	63	37
20	male	26	15	8	9	4	1					63		
	female	7	11	9	5	3	5					40		
	Total	33	26	17	14	7	6					103	57	43
30	male	21	20	11	3	2						57		
	female	8	18	12	6	10	2	1		2		59		
	Total	29	38	23	9	12	2	1		2		116	58	42
40	male	8	11	11	4	2	3					39		
	female	4	13	17	6	7	2	1			1	51		
	Total	12	24	28	10	9	5	1			1	90	40	60
50	male	10	6	7	1	5	1		1			31		
	female	3	8	15	10	7	2		1	1		47		
	Total	13	14	22	11	12	3		2	1		78	35	65
60	male	4	1	3	3	1		1				13		
	female	1	4	7	2	4	1					19		
	Total	5	5	10	5	5	1	1				32	31	69
70	male		3	1								4		
	female	5	3	10	5	2	1	1				27		
	Total	5	6	11	5	2	1	1				31	35	65
80	male	2	1	2	1							6		
	female	3	1	3		1	2					10		
	Total	5	2	5	1	1	2					16	43	57
90	male		1	1	1		1					4		
	female		4	6	2	1						13		
	Total		5	7	3	1	1					17	29	71
Grand total		151	153	151	66	56	24	6	3	3	1	614	49.5	50.5

TABLE 13
Relation of Overweight to Various Levels of Blood Pressure in Diabetes with
Hyperthyroidism (John)

BLOOD PRESSURE		120	140	160	180	200	220	240	TOTAL	INCIDENCE PER CENT	
										BELOW 140	ABOVE 140
Overweight Per cent 10	male		7	8	4				19		
	female	3	11	11	7	2	3	2	39		
	Total	3	18	19	11	2	3	2	58	36	74
20	male	5	3		4	3	3	1	8		
	female	5	3	6					25		
	Total	10	6	6	4	3	3	1	33	48	52
30	male	2	2	3	1	2			10		
	female	2	3	7	9	4	1		26		
	Total	4	5	10	10	6	1		36	25	75
40	male	1	1	1					3		
	female	2	4	4	5	4	2		21		
	Total	3	5	5	5	4	2		24	33	67
50	male		1	3	1				5		
	female	1	3	10	4	1			19		
	Total	1	4	13	5	1			24	20	80
60	male			1					1		
	female		2	1		1	1		5		
	Total		2	2		1	1		6	33	67
70	male								0		
	female		1		1				2		
	Total		1		1				2	50	50
80	male								0		
	female						1		1		
	Total						1		1	0	100
90	male								0		
	female	2							2		
	Total	2							2	100	0
Grand total		21	43	55	36	17	11	3	186	34.3	65.7

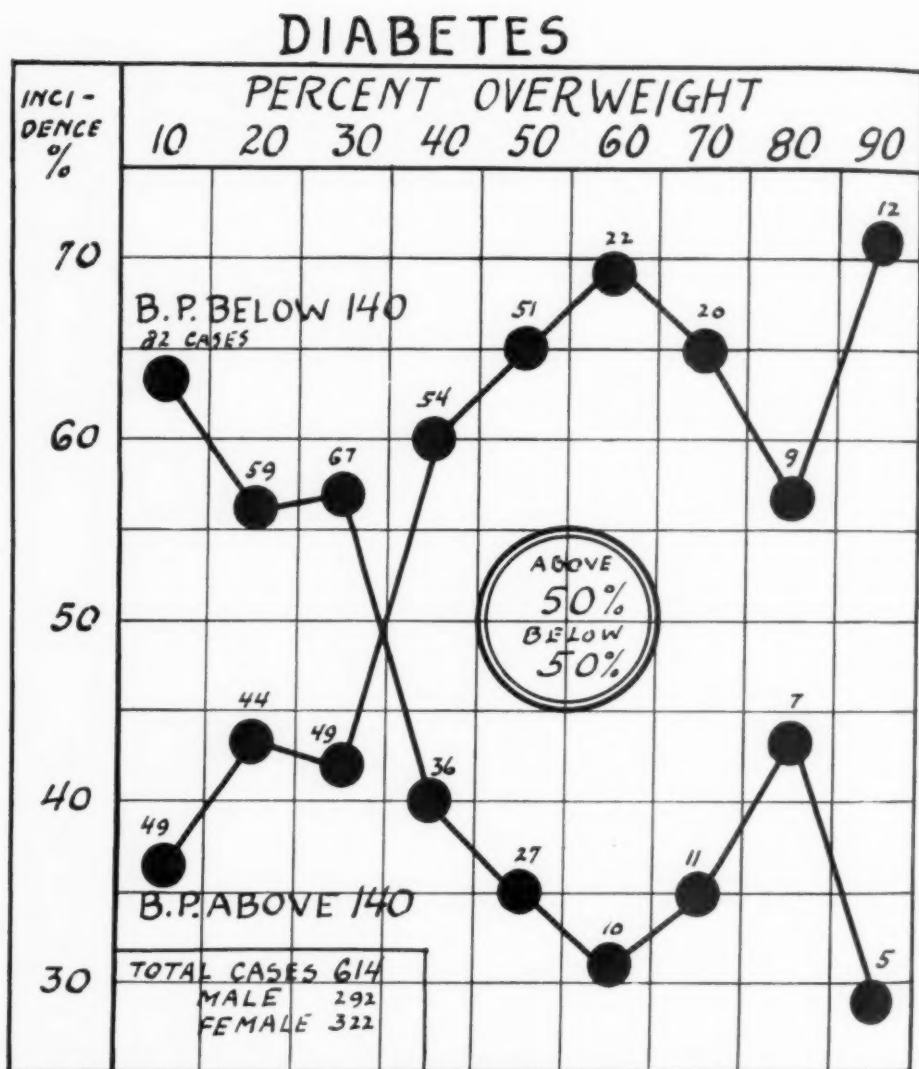


CHART VII. The relation of per cent of overweight to rise in blood pressure in diabetes.

of the relationship of overweight and underweight to hypertension, that is, a blood pressure below and above 140 mm. in diabetes and in diabetes with hyperthyroidism. In both conditions there is a definite increase in the incidence of hypertension in cases presenting overweight, and a definite decrease in the incidence of hypertension, which is most marked in uncomplicated diabetes, in cases of normal weight or underweight.

SUMMARY

1. Blood pressure in non-diabetics rises proportionately higher in the case of obese individuals than in those of normal weight (approximately 12 per cent increase).

2. Reduction in weight in non-diabetics brings about reduction in blood pressure.

3. The consensus of opinion of various authors is that the blood pressure is higher in diabetics than in normal

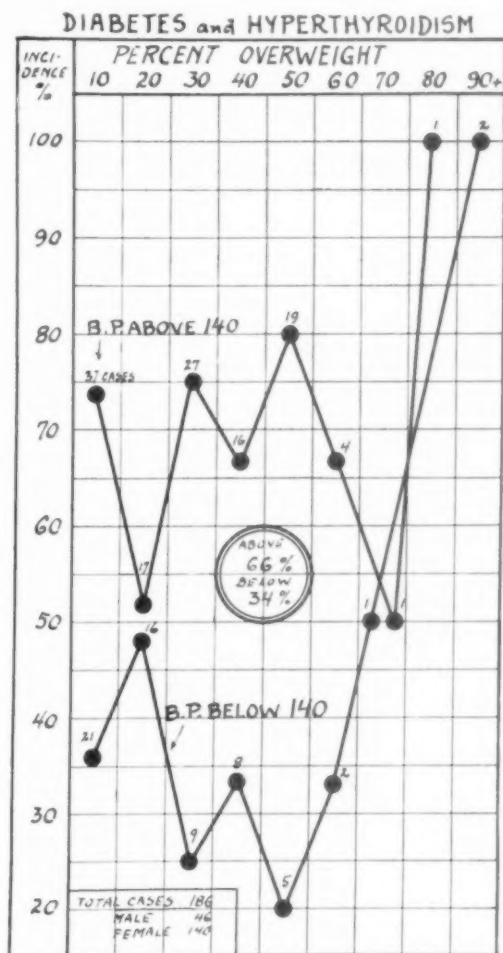


CHART VIII. The relation of per cent of overweight to blood pressure in diabetes with hyperthyroidism.

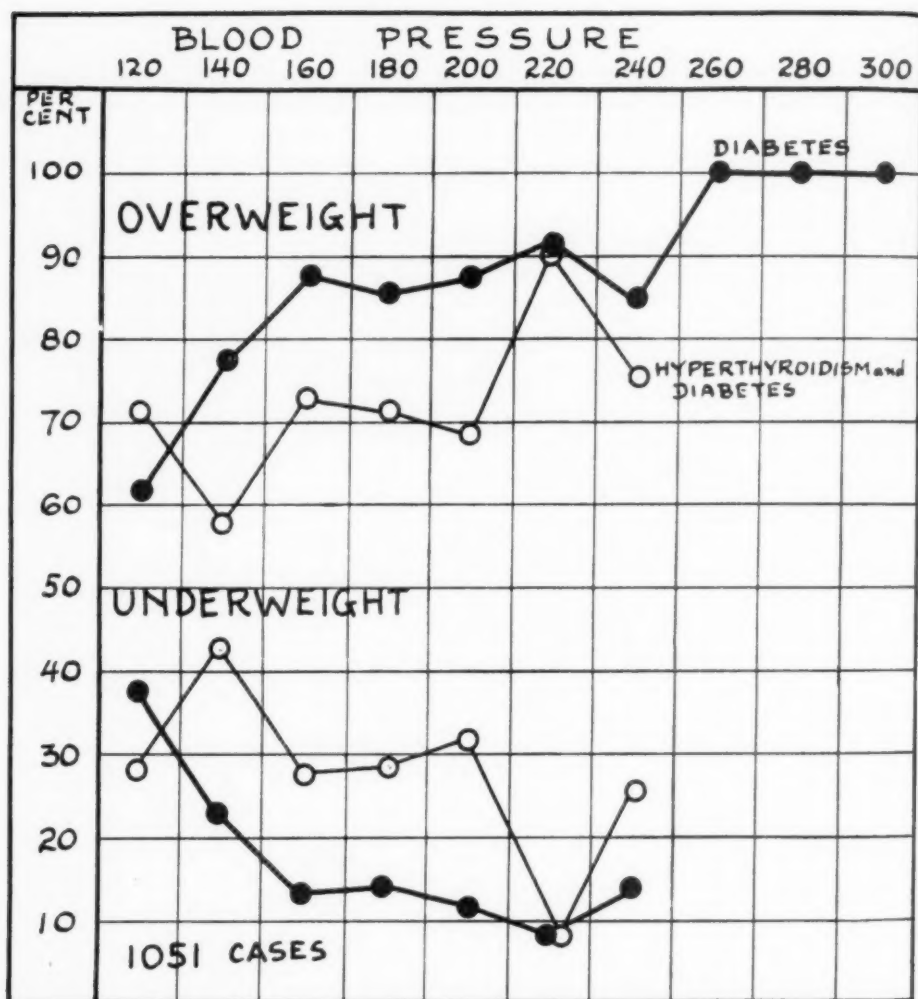


CHART IX. The comparative relationship of overweight, underweight, to the blood pressure incidence in diabetes and diabetes with hyperthyroidism.

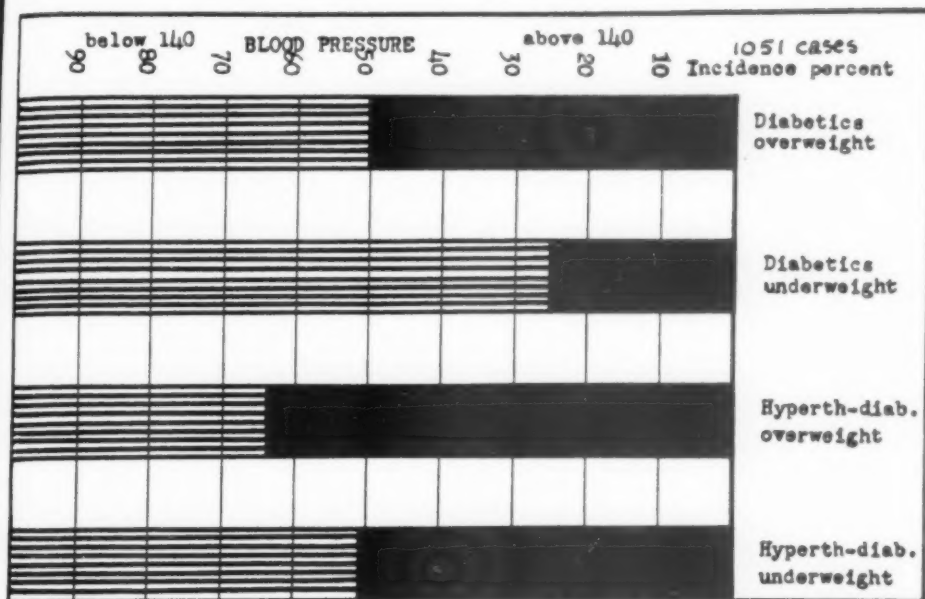


CHART X. A summary of an analysis of the relationship of underweight and overweight to blood pressure level classified below and above 140 mm. in diabetes and in diabetes with hyperthyroidism.

individuals of the same age. In my own series of 1828 cases of diabetes the blood pressure was the same as in normals below and including the fourth decade; above this age the incidence of high blood pressure was greater in diabetics.

4. In my series of 443 cases of diabetes associated with hyperthyroidism 37.6 per cent of the patients had a blood pressure below 140 mm. and 62.4 per cent had a blood pressure above 140 mm. against 54.3 and 45.7 per cent respectively in diabetes not associated with hyperthyroidism.

5. In my series of cases the diabetics up to 30 years of age showed hypertension only in 9 per cent whereas in diabetics with hyperthyroidism, hypertension was present in 42 per cent of

this group of young individuals. Up to the fifth decade, hypertension in itself presents no marked incidence of diabetes; after the fifth decade the incidence rises markedly.

6. In 50 cases of hypertension in my series, glycosuria was present in 36 per cent. In 50 glucose tolerance tests on these individuals, 39 per cent showed glycosuria in the presence of a normal curve and 55 per cent showed no glycosuria in the presence of a diabetic curve.

7. The renal threshold in cases of hypertension is high.

8. A close relationship exists between hypertension and diabetes, and hypertension occurs more frequently in diabetics than in non-diabetics.

TABLE 14

Summary of All Underweight* Patients in Relation to Blood Pressure (John)

BLOOD PRESSURE			120	140	160	180	200	220	240	TOTAL	INCIDENCE PER CENT	
											BELOW 140	ABOVE 140
DIABETES	Under-weight Per cent 10	male female	27 16	20 9	7 8	4 2	3 3	1 1	1	63 39		
		Total	43	29	15	6	6	2	1	102	71	29
	20	male female	13 11	7 6	3 1	3 1	1 1			27 20		
		Total	24	13	4	4	2			47	79	21
	30	male female	9 9		1 1	1				10 14		
		Total	18	3	2	1				24	87	13
	40	male female	1 3							1 3		
		Total	4							4	100	0
Grand Total			89	45	21	11	8	2	1	177	75	25

DIABETES WITH HYPERTHYROIDISM	10	male female	1 4	10 8	4 9	6	5		1	15 33		
		Total	5	18	13	6	5		1	48	48	52
	20	male female		4 7	2 3	2 5	3	1		8 20		
		Total	1	11	5	7	3	1		28	43	57
	30	male female	2	2	2	1				0 7		
		Total	2	2	2	1				7	57	43
	40	male female		1						0 1		
		Total		1						1	100	0
Grand Total			8	32	20	14	8	1	1	84	47	53

*In underweight I have classified actual underweight, normal weight and up to ten per cent above normal weight throughout the paper.

TABLE 15
Comparative Study of Overweight and Underweight in 1051 Cases With Their
Respective Relation to Blood Pressure (John)

BLOOD PRESSURE			120	140	160	180	200	220	240	260	280	300	TOTAL	%
OVERWEIGHT	Diabetes	male female	101 50	77 76	60 81	27 39	17 39	7 17	2 4	1 2	3	1	292 312	
		Total	151	153	141	66	56	24	6	3	3	1	604	
	Diabetes Hyperth.	male female	8 13	14 29	16 39	6 30	2 15	11	3				46 140	
		Total	21	43	55	36	17	11	3				186	
Grand Total			172	196	196	102	73	35	9	3	3	1	790	75.1
UNDERWEIGHT	Diabetes	male female	50 39	27 18	11 10	7 4	4 4	1 1	1				101 76	
		Total	89	45	21	11	8	2	1				177	
	Diabetes Hyperth.	male female	1 7	14 18	6 14	2 12		8	1	1			23 61	
		Total	8	32	20	14	8	1	1				84	
Grand Total			97	77	41	25	16	3	2				261	24.9
ALL CASES	Per cent overweight		63.9	72	83	80	82	92	82	100	100	100		
	Per cent underweight		36.1	28	17	20	18	8	18	0	0	0		

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The Fallacy of the Weighed Diet in the Treatment of Diabetes Mellitus*†

By HELMUTH ULRICH, M.D., F.A.C.P., *Boston, Massachusetts*

THE weighing of food is regarded as a great hardship by nearly all sufferers from diabetes mellitus, and I have become convinced that it is a burden they should not be required to bear. Hairsplitting figures concerning carbohydrate, protein and fat may make a fine appearance in a published article, but it is unlikely that they ever represent the actual conditions that obtain in the patient's kitchen. I am sure that the weighing of food is practiced much less than it is preached.

Weighed diets are prescribed because they are supposed to make possible an accurate computation of the nutritive value of the food that is eaten by the patient. In order that the expenditure of time and energy required for the process of weighing shall be warranted it is necessary to prove, (1) that the accuracy that is assumed to accrue is actually attained; (2) that the degree of accuracy, if achieved, is sufficiently great to pay for the effort; (3) that good results can not be obtained by a simpler method.

Concerning the first of these, the at-

tainment of accuracy, it may be natural to assume offhand that careful weighing of the food enables one to know exactly the amount of carbohydrate, protein and fat that is absorbed by the body and the number of calories derived therefrom; but it requires very little ingenuity to expose the fallacy of such an assumption. There are too many variables.

One of them is the process of digestion and absorption. It varies with different persons and in the same person at different times. Changing nervous and mental states, the varying activities of the gastrointestinal canal and its accessories, the effect of the composition of the diet on the rate and other phases of digestion, and probably many other known and unknown influences are involved.

The amount of cellulose in the diet, for example, is said to have a bearing on the utilization of protein and other foods. Also, slow absorption of a certain amount of carbohydrate, taken as slowly digested starch, appears to have less influence on the level of the blood sugar than rapid absorption of the same amount of carbohydrate taken as easily assimilated dextrose.

That is illustrated by table I which shows the difference between the changes of the level of blood sugar pro-

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duced in two fasting patients after the ingestion of 50 grams of dextrose and an equivalent amount, 250 grams, of boiled potato. In case I the blood sugar increased 86 per cent following dextrose and 50 per cent after the potato; in case II it increased 100 per cent after dextrose and only 50 per cent from the potato.

An important error in the process of weighing is introduced by the variable composition of items of food. Superficial study of any of the tables of food analyses will support this assertion.

Take the item of meat, for example. The much quoted tables by Atwater and Bryant¹ indicate, as shown in table II, that there are great variations in the composition of cooked beef.

Similar differences are found with other foods. The sugar in orange juice varies from 5.04 to 14.3 per cent;² the carbohydrate, exclusive of fiber, in the edible portion of carrots has a variation of from 5.9 to 11.5 per cent;* beets

*All data of analyses contained in this article are taken from Atwater and Bryant's tables, unless it is stated otherwise.

vary from 3.2 to 14.4 per cent and parsnips from 6 to 14.2 per cent. Even eggs, seemingly so uniform, vary in protein from 11.4 to 17.4 per cent, and in fat from 8.6 to 15.1 per cent.

Table III shows the variations that may occur in a day's ration designed by Joslin³ to contain 30 grams of carbohydrate, 48 grams of protein and 119 grams of fat. Theoretically it supplies 1,383 calories.

As a basis for constructing the table I have assumed the possibility that on certain days the ration may contain the minimal food values given for each item by Atwater and Bryant and others, and on other days the maximal values. For the estimation of the caloric value and its variation, however, I have combined the maximal amount of fat with the minimal amounts of protein and carbohydrate of each item, and vice versa, except in the case of fruits and vegetables. That is to say, a portion of meat with much fat usually contains a correspondingly small amount of protein, but fruits and vegetables that are high in protein are likely

TABLE I
Difference between the Changes of the Level of the Blood Sugar, in Milligrams per 100 c.c.,
Following Ingestion of 50 Grams of Dextrose and 250 Grams of Boiled Potato

TIME	CASE 1		CASE 2	
	DEXTROSE	POTATO	DEXTROSE	POTATO
Before	307	334	200	148
1 hour	400	364	307	190
2 hours	571	444	363	222
3 hours	500	500	400	210
4 hours	400	444	307	190
5 hours	307	398	250	174
Rise in mg.	264	166	200	74
Rise per cent.	86	50	100	50

TABLE II
Variations in the Composition of Cooked Beef (Atwater and Bryant)

	PROTEIN	FAT	FUEL VALUE PER POUND
Roast Beef	14.5 — 29.7%	19.6 — 41.4%	1210 — 2030 Cal.
Round Steak	20.3 — 34.1%	3.3 — 16.9%	615 — 1170 Cal.
Loin Steak	20.6 — 26.6%	11.8 — 35.7%	925 — 1875 Cal.

TABLE III
Variations That are Possible with a Carefully Weighed Diet Planned to Contain 30 Grams of Carbohydrate, 48 Grams of Protein and 119 Grams of Fat

	GRAMS	CARBOHYDRATE		PROTEIN		FAT		CALORIES	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Bacon ^a	30	0	0	1.9	5.4	7.5	15	89	143
Egg (one)		0	0	5.7	8.7	4.3	7.5	73	90
Chicken ^b	45	0	0	7	11.4	0.7	12.7	52	142
Meat ^c	45	0	0	6.8	15.3	1.5	34.1	75	334
40% cream ^d	150	2.2	4.5	3.1	3.3	60	63	571	588
Grapefruit ^e	200	9.2	17	0.6	1.2	0.2	0.4	41	76
Lettuce	50	0.6	1.9	0.3	0.9	0.1	0.3	5	14
5% vegetables	420	7.1	26.9	0.8	25.2	0	5.9	32	261
Butter ^f	30	0	0	0.1	1	23.3	26.1	214	235
Total		19.1	50.3	26.3	72.4	97.6	165	1151	1883

^aThe fat content of fried bacon is estimated. Accurate data are not available.

^bIncluding fowl.

^cCooked beef only. Satisfactory data for other cooked meats are not available. If other meats were included the variations would probably be greater.

^dPercentages of fat in 40% cream were supplied by H. P. Hood and Sons, Boston; percentages of carbohydrate and protein are from data supplied by Massachusetts State College and from Joslin.³ The figures given here apply to 40% cream only; if ordinary "heavy" cream were used the variation of fat would be much greater.

^eData for grapefruit are from Chatfield and McLaughlin.²

^fData for butter were supplied by Massachusetts State College.

to be high in carbohydrate, also. This adjustment makes the variations of the caloric values given on the table much less fanciful.

I readily grant that the grouping of all minimal or all maximal values on any one day must be looked upon as an academic possibility only. Usually the extremes will have a tendency to balance each other and form a more or less constant daily mixture. But that means that it is not the weighing but the law of chance that determines the relative uniformity of the diet. The same law would operate if a simpler method were used.

A majority of the foods have been analyzed in their raw state; but cooking has a profound influence on their composition. It removes much of the carbohydrate from vegetables and much fat from meats.

For an illustration let us take bacon. Smoked, uncooked bacon is listed as containing from 40 to 79.7 per cent fat, which in itself is a large variation,

amounting to a difference of about 90 calories in a serving of one ounce. Fried bacon (not listed by Atwater and Bryant) is assumed to contain about 40 per cent of fat by Campbell and Porter,⁴ and 50 per cent by Joslin³ and Huddleson.⁵ How closely this is approached depends on the degree of frying. Estimates based on the loss of weight resulting from the frying indicate that crisp bacon may contain as little as 25 per cent of fat and lightly fried bacon as much as 50 per cent. In regard to vegetables, von Noorden long ago called attention to the great loss of carbohydrate that was brought about by the process of cooking. He stated that raw spinach, for example, contains 2.97 per cent of carbohydrate, cooked spinach only 0.85 per cent.

Another uncertainty, a very important one, is introduced by the patients' inability or unwillingness to carry out orders. Intentionally or not they frequently break a set of rules or a dietetic prescription. The unintentional

violations may be eliminated by training; control of the wilful infractions is more difficult. I am convinced that a dietetic prescription that requires weighing of the food is broken more often than one that is carried out more easily. The order to weigh food, therefore, may defeat the very purpose for which it is given.

All this shows that accuracy can not be achieved by the use of the scales.

It may be argued that the weighing method, although admitted to be not wholly accurate, may nevertheless approach accuracy more closely than any other method. This must be conceded, at least in theory. It brings us to the consideration of the second and third postulates stated at the beginning, namely, that the degree of accuracy must be sufficient to pay for the effort, and that good results can not be obtained by a simpler method.

They may be considered together, because they are interdependent. If weighing of the food is the only method by which a reasonable degree of accuracy can be reached, then the scales must be used; but if a simpler method is nearly as accurate, then the expenditure of time and energy required for the process of weighing is not warranted.

When I began to treat diabetes I followed the prevalent custom of prescribing weighed diets, but I abandoned that method very soon. During the past ten years I have not asked one of my patients to follow it. I am using more easily understood household measures and natural food units in my dietetic prescriptions. The menu given in table IV is an example. The percentages of carbohydrate, protein and fat in this table are rough approxima-

tions only, but I am confident that they are nearly as accurate as if the food had been weighed with the utmost care.

This statement is supported by the results obtained with a group of patients who received an unweighed diet and whose level of the blood sugar was determined on several consecutive mornings before breakfast. A comparison of these results with others obtained with patients receiving a weighed diet showed no significant differences in regard to the daily variations of the blood sugar.

I am aware that dietetic prescriptions by weights and calories are easier for the physician. I use them constantly in the hospital where the services of a trained dietitian are available. Outside of the hospital, however, the burden of translating such a prescription into a day's menu is placed on the patient. A few patients have sufficient leisure, inclination and intelligence to do it in a satisfactory manner; many more have not. They should not be required to perform a task that properly belongs to the physician.

The many and changing systems of the dietetic treatment of diabetes give support to the thesis that burdensome attention to minute details is not necessary. Sansum⁶ prescribed high carbohydrate diets; Newburgh and Marsh⁷ advocated high fat diets; Allen depended on starvation; and all of us allow more carbohydrate now than we did in the past. Rabinowitch⁸ has recently emphasized again that slight undernutrition, stressed also by Allen⁹ and others, appears to be more effective in the treatment of diabetes mellitus than painstaking attention to the percentage composition of the diet.

A D

Fruit

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Baco
CereCrea
Butt
CoffBro
Mea
VegButt
Crea
Tea
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VegEgg
Oliv
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1At

2Ch

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4CA

5H

TABLE IV
A Day's Ration by which Approximate Accuracy Is Reached without the Use of the Scales

	CARB.	PROT.	FAT	CAL.
BREAKFAST				
Fruit (one of the following):				
$\frac{1}{2}$ small grapefruit; 1 medium peach;				
1 small or $\frac{1}{2}$ medium orange; $\frac{1}{2}$ cup berries;				
$\frac{1}{2}$ small or $\frac{1}{4}$ large cantaloupe	10	1	0	44
Egg: one	0	6	6	78
Bacon: 4 half or 2 whole slices	0	5	14	146
Cereal or Bread (one of the following):				
Oatmeal, cooked thin, $\frac{1}{2}$ cup;				
Oatmeal, cooked thick, $\frac{1}{4}$ cup;				
$\frac{1}{2}$ cup cornflakes, puffed rice or wheat;				
$\frac{1}{2}$ shredded wheat;				
1 small slice of bread, $4 \times 3 \times \frac{3}{8}$ inches;				
2 soda crackers	10	2	0	48
Cream: 2 tablespoons heavy or $\frac{1}{4}$ cup light	2	2	12	124
Butter: 1 tablespoon	0	0	12	108
Coffee or Tea, unsweetened or with saccharine				
Total	22	16	44	548
DINNER				
Broth, clear, fat removed	0	3	1	21
Meat: lean, or fish, cooked, 1 slice, $4 \times 3 \times \frac{1}{2}$ inches	0	16	10	154
Vegetables: 5%, no limit;	4	2	0	24
10%, $\frac{1}{2}$ cup cooked	5	1	0	24
Butter: 1 tablespoon	0	0	12	108
Cream: 1 tablespoon heavy, or 2 tablespoons light	1	1	6	62
Tea or Coffee: as for breakfast, if desired	0	0	0	0
Dessert: fruit as for breakfast	10	1	0	44
Total	20	24	29	437
SUPPER OR LUNCHEON				
Broth: as for dinner	0	3	1	21
Vegetables: 5%, no limit;	7	2	0	36
10%, $\frac{1}{4}$ cup				
Egg: one	0	6	6	78
Olive Oil: 1 tablespoon, with vinegar	0	0	15	135
Bread: 1 small slice or 2 crackers, as for breakfast	10	2	0	48
Butter: 1 tablespoon	0	0	12	108
Milk: 1 glass (8 ounces)	12	8	10	170
Total	29	21	44	596
Total for 24 hours	71	61	117	1581

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Myxedema

A Case Report*

By HENRY B. GOTTEN, M.D., *Memphis, Tennessee*

CLASSICAL myxedema is seldom seen. The case reported herein is interesting in that it presents practically all the characteristics of an extreme hypothyroidism.

Mrs. W. D. H., aged thirty, came to the clinic on November 17, 1930, complaining of exhaustion, lack of energy, and weakness, and stating that these symptoms had persisted since the birth of her last child, seven years earlier. She had spent a part or all of each day in bed for a number of years. During that time she had gained about thirty pounds in weight. Menstruation was irregular; the periods appeared every six to eight weeks and were very scant. Her eyes often became very puffy, and her feet were sometimes swollen. She suffered a great deal from colds and was always chilled. Her digestion was very poor: she was unable to eat sweet or greasy foods, was frequently troubled with nausea and vomiting, and for a long while had been severely constipated. On one occasion she had had an acute attack of colic.

The patient was five feet, one inch in height and weighed one hundred thirty pounds. Her skin was pasty in color, was cold, dry, puffy, and did not pit on pressure. A moderate anemia was obvious. Blood pressure was 110/70, pulse 70, and temperature 98 degrees. Reflexes were markedly retarded, particularly on relaxation. Psychic response was sluggish. No other physical signs were found.

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The laboratory test of the urine was reported negative. The white blood count was normal, but the red blood count was only 3,400,000, and the hemoglobin 52 per cent.

The basal metabolic rate was minus 42. Roentgenograms of the skull were negative.

The heart was typically myxedematous, being grossly enlarged. The right side measured 5.7 cm. and the left 11.2 cm.,—a total of 16.9 cm. (figure 1). Electrocardiographic tracings revealed a right axis deviation with slurring of the Q. R. S. complexes in all three leads. The voltage was low (figure 2).

Four grains of desiccated thyroid were given each day for a period of two months. During that time the patient improved rapidly. The reflexes returned to normal. Her weight decreased to 110 pounds. The hemoglobin increased to 70 per cent, and the red cell count rose to 3,800,000. At the last examination the pulse rate was 100. The metabolic rate was plus 10. The heart had become normal in size, as shown by the roentgenogram: the right side measured 2.5 cm. and the left 9 cm.,—a total of 11.5 cm. (figure 4). The electrocardiograph was considered normal. The Q. R. S. complexes were upright in leads I and II and inverted in lead III, which was interpreted as an axis deviation. The T waves were upright in all of the three leads (figure 3).

Several factors in this case are sufficiently interesting to warrant discussion. The dullness and listlessness characteristic of hypothyroidism were present. Although the psychomotor activity was decreased, the senses were

normally acute and the mentality seemed unimpaired. Retardation of the reflexes, especially of the Achilles reflex, was one of the findings. The secondary anemia was outstanding; practically all symptoms could have been explained on the basis of pernicious anemia. The cardiac enlargement also marked the disease.

The retardation of all reflexes is a pathognomonic finding of myxedema. The condition is particularly evident on relaxation of the Achilles reflex and may be easily recognized without the aid of mechanical devices.

The first published account of this phenomenon was recorded in 1924, by W. C. Chaney.¹ He found that the kymograph demonstrated a slow Achilles reflex as compared to the normal. Since Chaney showed that in

other diseases characterized by a lowered metabolic rate, as pituitary tumor, this reflex is not retarded, it is always advisable to test the Achilles reflex when the patient has a low metabolic rate. In the more severe forms of anemia, this reflex is normal. Myxedema may thus be further distinguished from pernicious anemia.

An erroneous diagnosis of pernicious anemia is often made in myxedema. Each of the three cases reported by MacKenzie had previously been diagnosed pernicious anemia. Error is especially likely if examination of the gastric contents reveals no free hydrochloric acid. Although hydrochloric acid is present in many cases of myxedema, it is not always a finding; therefore one cannot distinguish myxedema and pernicious anemia by its absence.



FIG. 1. Heart in case of myxedema before treatment.

Each of twenty-three patients reported upon by Stone was anemic to some extent; in a few the hemoglobin was as low as 40 per cent. The gastric secretions of several contained no trace of hydrochloric acid.

The characteristics of pernicious anemia as opposed to those of the anemia of myxedema are (1) the presence of macrocytes and megalocytes, (2) the high color index, (3) the abnormal appearance of the red blood cells, (4) spinal cord changes, (5) a normal metabolic rate, and (6) a history of remissions and exacerbations of symptoms. The age of the patient is

also a consideration. Pernicious anemia seldom develops in persons so young as the patient in this case.

Zondek⁸ first reported cardiac enlargement in myxedema in 1918 in Germany. In this country it was described by Fahr⁵ in 1925. Davis³ recently collected twenty-one cases in the literature, to which he added another of his own. The enlarged heart, therefore, is now recognized as a feature of this disease.

In the myxedematous heart the chambers are equally dilated. Neither the bulging of the conus arteriosus and pulmonary arteries of mitral stenosis,

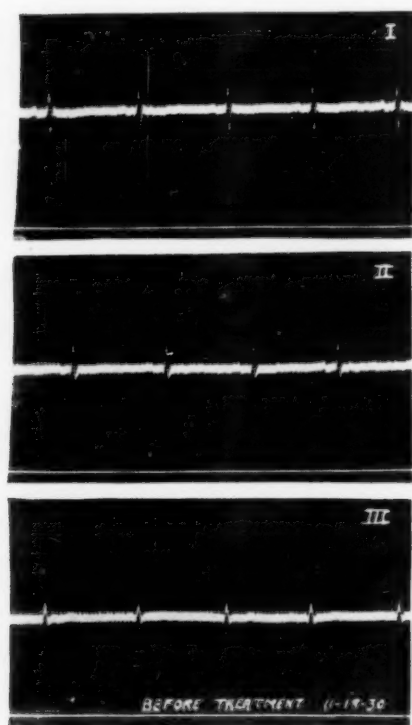


FIG. 2. Electrocardiographic tracing in a case of myxedema before treatment. Note low voltage, flat T waves, and increased P-R interval (almost 0.2 sec.).

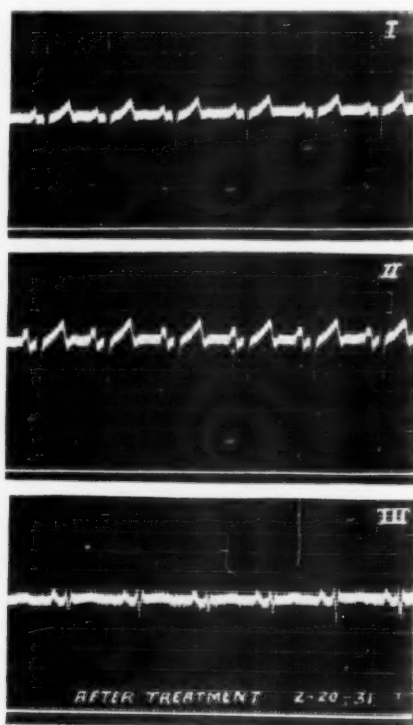


FIG. 3. Electrocardiographic tracing in case of myxedema after three months' treatment. Note change in voltage and decrease of P-R interval.

nor the marked dilation of the left ventricle found in aortic lesions or hypertension, is present. The heart under the fluoroscope gives the appearance of a pericardial effusion. It has also been observed that the movements of the cardiac borders are very sluggish, in sharp contrast to the movements of the enlarged heart in other diseases.

The electrocardiographic changes in this condition are characteristic. The P waves may or may not be present; the T waves are usually negative in one or more leads. The P-R interval is abnormal in many cases. The Q, R, S, complexes are notched, frequently inverted, and the time interval is prolonged. If proper treatment is instituted, the heart will be reduced to its natural size. The irregularities of the

electrocardiographic tracing will also disappear. Fahr described several cases in which he withdrew the thyroid substance in order to more conclusively show the effect: the heart again became enlarged and the electrical tracing abnormal. When the thyroxin was resumed, the normal characteristics of the heart returned.

CONCLUSION

Physical and laboratory findings frequently overlooked in myxedema were demonstrated in this case, indicating the necessity for a thorough investigation in order to make a correct diagnosis. The rapid response of the affected systems to appropriate treatment is typical.

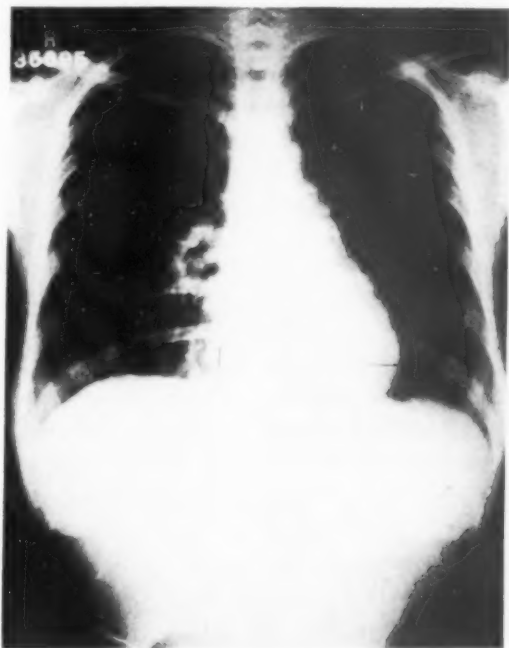


FIG. 4. Heart in case of myxedema after three months' treatment.

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"We Must Keep the Whole Organism in View"

"FINALLY, although I have been seeking a description of certain isolated phenomena occurring during the course of pneumonia, I have not been unmindful of the dictum of Professor Haldane, that in studying biological phenomena "we must keep the whole organism in view"—that the living organism is a whole, not merely a collection of its parts, and that whatever happens in one part of the body affects every other part. Moreover, experience abundantly teaches that conclusions regarding phenomena that occur in the test tube cannot be applied to the living body without reservations, and that what happens in one animal under certain circumstances does not necessarily happen in another under similar conditions. The conditions can never be identical. Biological phenomena can never be fully understood unless in addition to the study of isolated phenomena the "physis" also be studied, and by "physis" the Greeks meant "the organism—the organism as a whole". It is this element that medicine must not disregard, but experience teaches that we can best understand the whole by the study of the parts, not as isolated events, but in their relation to the entire organism."

From *The Nature of Pneumonia*, the Twelfth Pasteur Lecture, by RUFUS COLE, M.D. (Proc. Institute of Med., 1932, xi, 2-20.)

Hypothyroidism Without Myxedema*†

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DURING recent years considerable evidence has accumulated to emphasize the importance of hypothyroidism without myxedema as a separate clinical entity. A growing number of case reports and articles dealing with this condition indicates an increasing appreciation of its frequency and importance. Many of the reports have been from regions where goiter is common but the report of Thompson and Thompson¹ from the New England States, King² from Baltimore, and Higgins³ from Virginia show that the condition is not confined to such areas. The present report from a region where the general incidence of goiter is relatively low gives further evidence of the wide spread distribution of this condition.

However, in spite of this increasing interest, the disease is frequently overlooked because of the absence of signs and symptoms common to the better known form of hypothyroidism, myxedema. Patients with hypothyroidism without myxedema, characteristically present few or none of the better known signs and symptoms of hypofunction of the thyroid. The skin is

usually not dry, harsh, or thick; loss of hair seldom occurs. The patient is not unduly sensitive to cold, and the temperature is not subnormal. The pulse is not slow and may even be more rapid than normal. Hoarseness and mental lethargy, so frequently present in myxedema, are lacking. The disease may occur at any age but many of the patients are young or adolescent. Very often the symptoms are misleading, suggesting disease of other organs and systems and the primary location of the trouble in the thyroid gland is unsuspected. In many instances the accidental discovery of a low basal metabolic rate has been the first clue to the true nature of the trouble.

Nevertheless, these patients do present certain symptoms, or symptom complexes, which should suggest the possible presence of this type of hypothyroidism, particularly if more common causes for these symptoms cannot be found. The most frequent and important of these are constipation, nervousness, poor emotional control, fatigability, lack of energy, and vague pains localized in various regions. The onset of the disease is gradual and insidious and may date back a number of years. Women are more frequently affected than men. The patient never appears acutely ill and the vagueness

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of the symptoms, together with the absence of significant findings on examination may lead to the diagnosis of a psychoneurosis. The constipation is very intractable and is, perhaps, the most frequent symptom encountered. Nervousness, irritability and lack of emotional control are frequently presenting symptoms. Associated with this nervousness there is a certain lack of energy and endurance, mental as well as physical. This is particularly noticeable in the exhaustion which may follow the performance of the daily duties. Warfield⁴ has described well the active individuals whose energy is forced, and whose activity is followed by an abnormal weariness. To these symptoms may be added loss of weight, a change which is the opposite of that expected in hypothyroidism. This loss of weight, together with nervousness and a not infrequent increase in the pulse rate, may lead to the suspicion of thyrotoxicosis, which is rather startlingly contradicted by the finding of an abnormally low metabolic rate.

Laboratory examinations yield little of significance except the evidence of an abnormally low basal metabolic rate, which ranges from about the lower limit of normal to as low as minus 30 per cent or lower. This, although not pathognomonic of this condition, is the most characteristic finding and is necessary for the diagnosis. Of almost equal importance is the response to treatment with thyroid substance. The significance of these two factors is discussed more fully below. Warfield and Greene,⁵ and others, have described a secondary anemia of the chlorotic type, frequently associated with this type of hypothyroidism. While a secondary

anemia is common in this condition, it is not always present nor is it, of course, sufficiently characteristic to be of particular diagnostic significance.

Considerable confusion exists in regard to the finding of lowered metabolic rates in association with the menopause and other conditions. While it is undoubtedly true that lowered metabolic rates may be the result of other causes than primary hypothyroidism it is likewise true that the latter may occur with other diseases as an associated, not independent, condition.

A correct diagnosis of hypothyroidism is important because of the relief of symptoms which follows specific treatment with thyroid substance, a relief which is so definite that, as will be shown below, it is an important factor in determining the correctness of the diagnosis. It is also important that the diagnosis be made as early in the disease as possible in order that early treatment may prevent the development of structural changes in various organs and tissues, from long continued hypofunction of the thyroid. The effect of such hypofunction of the thyroid on the gastrointestinal tract has been emphasized by Brown.⁶ Barrett⁷ has called attention to the effect on the nervous system. Williamson and Pearse⁸ believed that the functional strain incident to long continued hypofunction is important in causing structural changes in the thyroid gland itself.

The following case reports are presented to illustrate various types of cases and different features of the disease. They have been selected from a total of seventeen cases of this condition observed in this clinic during the

past three years, most of which have been followed for a period of two years or more. In addition to the case reports the significance of certain laboratory findings, the effect of treatment and the relation of this disease to other forms of hypothyroidism are discussed.

REPORT OF CASES

Case I. V. G., aged 25, a single, white woman was admitted to the medical outpatient department complaining of headaches, nervousness, and pain in the arms. The present illness had begun about seven months before when she first noted a dull aching pain over her head and left side of the face, gradually increasing in severity. Increasing restlessness and insomnia were noted. For a year she had been unable to follow her usual occupation of teaching. There was a history of vague gastrointestinal symptoms associated with constipation for several years. The average weight was 132 pounds, and her weight was 128 pounds at the time of her first examination. There was no history of any menstrual disturbance.

Examination revealed a well-developed, well-nourished white female who was cooperative and mentally alert. There was some tenderness over the scalp but none over the sinuses. The pupillary reactions were normal. There was a slight external strabismus of the left eye. The sclera were clear, and the examination of the fundi was negative. The tonsils were small, smooth, not infected. There was a severe gingivitis about many of the upper teeth and diffuse dental caries. The thyroid was not enlarged. Examination of the chest and abdomen gave normal findings. The blood pressure was 126 systolic and 84 diastolic. The skin was soft, warm, dry, clear and of good tone. The neurological examination was negative. All the usual laboratory tests, including the urinalysis, the blood count and the Wassermann reaction, were negative. A tentative diagnosis of psychoneurosis was made, and she was treated with a mild sedative, but did not improve.

On March 16, 1929, she returned to the clinic with the same symptoms as those described a year before. This time a basal

metabolism determination was made, and to the surprise of the observer, the rate was found to be minus 26 per cent. Four days later it was minus 25 per cent. At this time it was thought there was perhaps a slight dryness of the skin, and a thinning of the outer half of the eyebrows. The patient appeared somewhat apathetic and complained of mental sluggishness. There was no edema, and no alteration in weight. A diagnosis of hypothyroidism was made.

Course. She was first given thyroid extract 0.13 gms. (gr. two) daily. On March 30, 1929, the basal metabolic rate was minus 19 per cent. The thyroid extract was increased to 0.065 gms. (gr. one) three times a day. On April 6, the basal metabolism was minus 10 per cent. The patient said she felt very much improved. Her bowels moved regularly and there was a general feeling of well-being. The thyroid extract was discontinued. On April 16, 1930, she returned with the symptoms of indigestion, fatigability and mental sluggishness. The basal metabolism determination was minus 29 per cent. She was again given thyroid, 0.065 gms. (gr. one), three times a day. On the 27th of April, she said she felt better, the bowels were regular, the appetite was good and the basal metabolism was minus 21 per cent. The same dose of thyroid extract was continued and on May 25, the basal metabolism was minus 8 per cent. On June 17, she still felt better as compared to first visit, but not as well as at the last visit. The basal metabolism was minus 18 per cent. On August 21, 1929, the patient was seen again with a return of all of her symptoms. She had discontinued thyroid medication and was back where she had started, with a basal metabolic rate of minus 29 per cent.

Comment. There is presented a young woman with a metabolism rate within the "myxedema range", who nevertheless showed no myxedema, no change in weight, no menstrual disturbances, and only slight dryness of the skin. Many of the common symptoms of myxedema were lacking. She responded favorably to the administra-

tion of thyroid extract but never had enough to bring the basal metabolism up to normal. Discontinuance of the drug was associated with a return of the clinical features of the disease. Except for the finding of a low metabolic rate and the response to specific therapy there was little to indicate the existence of the hypothyroidism.

Case II. B. T., white female, aged 48, was seen in the medical outpatient department July 7, 1929, complaining of nervousness, insomnia, increasing irritability and moroseness. In addition she had severe headaches in the back of her head. The menopause had begun some two years before and the uterus had been removed a year before admission. Examination revealed a well-developed, and well-nourished woman. The examination of the ears, eyes, nose, and throat was negative. The thyroid isthmus was distinctly enlarged, but the lobes were barely palpable. The remainder of the examination was normal. The blood pressure was 140 systolic and 80 diastolic. The weight was 115 pounds. The skin was fine in texture, elastic, of good quality, and normally warm and moist. A tentative diagnosis of psychoneurosis was made but the basal metabolism was found to be minus 17 per cent. A second test the following day was again minus 17 per cent. The patient was given thyroid extract, 0.1 gm. (gr. one and one-half), daily, and in three weeks the basal metabolic rate had risen to plus 5 per cent. The thyroid extract was discontinued for ten days and the basal metabolism promptly dropped to minus 26 per cent. Thyroid extract was then given in doses of 0.065 gms. (gr. one) three times a day for three days and 0.065 gms. (gr. one) twice daily for three days and then 0.1 gms. (gr. one and one-half) daily. On September 19, the patient returned feeling quite well. The basal metabolic determination was minus 7 per cent. Thyroid extract 0.1 gms. (gr. one and one-half) daily was continued during a period of fifteen months, the basal metabolism ranging between minus 8 and plus 1 per cent. On October 3, 1930, she came for a chat say-

ing she was very much improved and had continued to take thyroid extract, 0.1 gms. (gr. one and one-half), daily.

Comment. This case is an example of a lowered metabolic rate following the menopause. Because of the favorable response to treatment with thyroid extract, both subjectively and in the effect on the metabolic rate, a diagnosis of hypothyroidism independent of the menopause is warranted.

Case III. Z. M., a married woman, aged 42, was admitted to the medical outpatient department on August 2, 1929, complaining of nervousness, and mental depression. All her life she had been more or less nervous, as were many members of her family. Ten months before her admission, her menstruation had ceased and two months later she had had influenza. Following the attack of influenza she felt weak, much depressed, emotionally unstable, and was forced to stay in bed for two months. One month before her admission, she had had a severe menstrual period lasting four days. Following this the nervousness increased, her appetite was poor and she lost weight. There had been no noticeable skin changes, and no constipation. The physical examination was essentially negative save for emaciation; she weighed only eighty-nine pounds. The urinalysis and Wassermann tests were negative. The blood showed a moderate secondary anemia with a hemoglobin of seventy per cent. A tentative diagnosis of psychoneurosis and undernutrition was made. The patient was treated with sedatives and psychotherapy but made no progress. On October 12, the basal metabolism was found to be minus 11 per cent. She was given thyroid extract, .038 gms. (gr. one-half), twice a day and improved somewhat. On December 2, the basal metabolic rate was still minus 11 per cent and the thyroid extract was discontinued. Within one week the rate dropped to minus 20 per cent. Thyroid extract was again given in doses of .038 gms. (gr. one-half) three times a day, but this amount produced no change in the basal metabolic rate and few changes in the symp-

toms. On January 27, 1930, the basal metabolic rate was minus 22 per cent. It was decided to push the drug and she was given 0.13 gms. (gr. two) daily. The basal metabolism rose to minus 10 per cent, the patient felt very much improved, began to gain weight and the nervousness disappeared. By April 10, 1930, she had gained eight pounds, the metabolic rate was minus 1 per cent and the thyroid extract was continued. On June 10, the basal metabolism was minus 6 per cent, her weight was 102 pounds and she felt well. The thyroid extract was reduced to 0.065 gm. (gr. one) and 0.13 gm. (gr. two) on alternate days. She was observed from August to October during which time she continued to improve, the basal metabolism ranging from minus 6 to plus 6 per cent. During that interval she gained 6¼ pounds.

Comment. This patient was very much improved with thyroid extract, and such features as loss of weight, nervousness, and mental sluggishness disappeared. Symptoms referable to the menopause were little affected. It is interesting to note that an initial low metabolism became even lower after thyroid medication, once started, was discontinued, and that rather large amounts of the thyroid extract were necessary to raise the metabolism to a normal level. The significance of these observations is more fully discussed below. The administration of amounts sufficient to raise the metabolism to normal was necessary to secure subjective improvement.

Case IV. J. T., woman, aged 20, was admitted to the medical outpatient department on September 3, 1929, complaining of nervousness and abdominal distress. An appendectomy had been performed for these symptoms with no relief. Her appetite was variable and for a long time she had suffered with constipation. She was troubled with disturbed sleep and worried a great deal.

The examination revealed a well-developed,

well-nourished young woman of normal weight (112 pounds), who was very emotional and apprehensive. The skin was coarse and dull, the mucous membranes were pale. The eyes, ears, nose, and throat were essentially normal. The thyroid was slightly enlarged at the isthmus, otherwise normal. The examination of the heart and lungs was normal. The blood pressure was 105 systolic and 45 diastolic. There was a scar in the right lower quadrant of the abdomen, but no tenderness, no spasm, no masses and no palpable organs.

The tentative diagnosis was a functional disturbance of the gastrointestinal tract, constipation and mild secondary anemia. Treatment was directed toward these, but with no improvement. On her third visit to the clinic a basal metabolism determination was obtained and the rate was minus 17 per cent. A check determination on October 5, was minus 23 per cent. She was then given thyroid extract .065 gms. (gr. one) three times a day. After one week the rate rose to minus 3 per cent. The patient was advised to continue with thyroid extract, 0.13 gms. (gr. two) daily and a week later the metabolism dropped to minus 10 per cent. The dose of thyroid was increased to 0.2 gms. (gr. three) daily, and the metabolic readings varied from minus 17 per cent to plus 3 per cent, depending on how conscientious she was about taking her medication. Finally her symptoms were controlled with 0.13 gms. (gr. two) of thyroid extract daily. The course of observation lasted over a period of eight months and space does not permit enumeration of the numerous metabolism readings. It must however, be mentioned that there were times, when the metabolism approached normal that the patient had nervousness and mild tremor. The best symptomatic improvement was observed with the basal metabolism at a level of minus 3 per cent. During the period she was receiving thyroid extract she gained weight and the emotional instability and constipation were controlled.

Comment. A young woman with none of the usual findings in the history and examination suggestive of myxedema was found to have a dis-

tinctly lowered metabolic rate and showed a decided improvement when given thyroid extract.

Case V. A. H., a white woman, aged 33, was admitted to medical outpatient department on September 13, 1929, complaining of a dull pain around the heart which had been present for 18 months and was not particularly related to exertion or excitement. There was no history of rheumatic fever. At times she felt weak, apathetic and fatigued; at others was very nervous and "jumpy". There had been a slight loss of weight (6 pounds). She had had frequent headaches in the past. There was no constipation. The menstrual history was normal.

Examination revealed an alert, healthy appearing young woman. Her skin was clear, smooth, and not cold. The examination of the heart and lungs was normal. The blood pressure was 105 systolic and 65 diastolic. Abdominal and pelvic examinations were negative. The Wassermann test and urinalysis were negative. The electrocardiogram was normal. The blood showed a slight secondary anemia, with the hemoglobin 66 per cent and the red blood cells 3,480,000. A tentative diagnosis of effort syndrome was made. On September 29, the basal metabolism was minus 28 per cent. She did not return to the clinic again until March 18, 1930, when the basal metabolic rate was found to be minus 24 per cent. The symptoms were the same.

Although this patient was not treated with thyroid extract the abstract is presented because there is illustrated an individual in the fourth decade of life, with no menstrual disturbances, no skin changes, without sensitiveness to cold, with certain symptoms such as emotional instability, fatigability and vague pains which are commonly seen in this type of hypothyroidism and an initial metabolic rate of minus 28 per cent. After a period of seven months without treatment, the same symptoms of hypothyroidism remain, the metabolism

is minus 28 per cent and there is no myxedema.

DISCUSSION

The existence of a syndrome such as that described above has naturally aroused discussion as to the exact relation between this and other forms of hypothyroidism and numerous classifications of the latter have been suggested. The most recent is that of Warfield,⁴ who divides hypothyroidism into three main groups: cretinism, myxedema of adults, and masked or occult hypothyroidism, the latter the condition which has been described here. Whether or not this hypothyroidism is to be considered a forerunner of myxedema or a premyxedematous stage of myxedema is questionable. Several of our patients have been observed over a period of months without the development of myxedema even though untreated. If one may judge from the history, the condition in some patients may have been present for years without the development of myxedema. Such evidence is not entirely convincing, however, since myxedema may be very gradual and insidious in its onset. Other evidence, however, supports the view that this type of hypothyroidism exists as an independent syndrome. The existence of a metabolic rate as low as minus 30 per cent for considerable periods of time without the appearance of myxedema is very suggestive. The occurrence of a definitely lowered metabolism in such conditions as inanition and the like without the presence of myxedema, with associated structural changes in the gland, is also important. Of particular interest in this connection is the work of Williamson and

Pearse⁸ who have described a specific pathologic change in the gland in myxedema, and who distinguish on the basis of these pathological studies between myxedema and other forms of hypothyroidism.

Some question may be raised as to the justification of the diagnosis of hypothyroidism when the above symptoms and a lowered metabolic rate are found in association with such conditions as the menopause or various other disease states. Since the symptoms are not particularly characteristic it becomes largely a matter of interpretation of the lowered metabolic rate, the significance of which is more fully discussed below. Thurmon and Thompson⁹ have recently stated that in many of these cases there is no primary hypothyroidism. We agree that this is true in many instances and the correctness of this view is supported by the failure in many cases, of thyroid substance to relieve the symptoms even though the basal metabolism is brought by this means to normal levels. We believe, however, that in certain cases, an independent hypothyroidism may exist in association with such conditions as the menopause and in these cases, existence of a primary thyroid disease as a cause of at least part of the syndrome is borne out by the improvement in certain of the symptoms by the administration of thyroid extract. Case two is an example of such an instance.

It is apparent that in the absence of characteristic symptoms and physical signs, great dependence is placed on the finding of a low basal metabolic rate. It is important, therefore, that the significance of this laboratory finding be clearly understood. Low basal meta-

bolic rates do not always mean hypothyroidism. They may be observed in trained subjects (because the usual clinical standards are too high for this group), in inanition, and with loss of muscular tone, as well as with disturbances of other glands of internal secretion. Thurmon and Thompson⁹ have recently classified patients with low basal metabolic rates into three groups, as follows: (1) those who are apparently healthy and have a low metabolism; (2) those with hypothyroidism too mild to result in myxedema, and (3) those in whom a lowered metabolism is associated with a pathological condition other than underfunction of the thyroid. We are in accord with this classification but emphasize that low rates mean hypothyroidism if the first and third group are ruled out, and further, that the determination of the basal metabolic rate is not only of great importance but a necessary means of making such a diagnosis. The common errors in the determination of the basal metabolic rate give falsely high values rather than low, and with rare exceptions falsely low rates cannot be obtained. Boothby and Sandiford,¹⁰ in a series of what they call questionable hypothyroidism, found in eighty-six cases an average below minus 20 in thirty, and below minus 11 in sixty-one instances. Means and Burgess¹¹ state that a low basal metabolic rate means hypothyroidism provided hypopituitarism, Addison's disease, starvation, et cetera, are ruled out. Therefore, in the absence of such conditions, with basal metabolic rates below minus 20, without frank myxedema, but with the symptoms mentioned above, a diagnosis

of hypothyroidism of the type described in this paper must be considered. The main difficulty of interpretation occurs in the case of individuals with a rate between minus 10 per cent and minus 20 per cent. In such instances we feel that in the presence of symptoms such as fatigability, mental sluggishness and constipation, a metabolism of minus 10 per cent or less strongly suggests hypothyroidism provided that the symptoms are relieved by the administration of thyroxin or thyroid extract coincident with a return of the basal metabolic rates to normal levels. If we interpret it in this way, a low metabolism may be safely used in this diagnosis.

Of particular importance in connection with the finding of basal metabolic rates in the neighborhood of minus 10 per cent are the observations in cases two and three. It will be noted that when treatment with thyroid substance was stopped after a short period of administration, the basal metabolic rate which had been minus 17 per cent in case two, and minus 11 per cent in case three, fell within a short period to a much lower level. The following explanation for this finding is suggested. There is evidence for the belief that the administration of thyroid substance to a normal subject leads to a certain amount of decreased function and atrophy of the gland. In the cases described it may be that the thyroid gland, though functionally insufficient, was able by straining to maintain the metabolism at a near normal level. Relieved of the stimulus to this activity by an artificial supply of hormone its activity fell to a subnormal level, as shown by the

lower metabolic rate, when the administration of thyroid stopped. If this explanation is correct it is possible that such a procedure would be of diagnostic importance in border line or mild cases of this condition.

The nature of the response to the administration of thyroid substance or thyroxin is of great importance. As a means of establishing the diagnosis it is of even greater importance than the determination of the basal metabolism since it serves to distinguish between the lowered metabolic rates due to primary and secondary hypothyroidism. In many cases the nature of the response to the drug may be the final evidence which establishes the diagnosis. In true primary hypothyroidism the relief of symptoms is strikingly quick and complete if a proper amount of the drug is used. A return of the symptoms characteristically follows a withdrawal of the drug. The patients are able to tolerate much larger doses without the development of symptoms of hyperthyroidism than are normal subjects. In many cases the amounts of thyroid necessary to raise the metabolic rate to normal and relieve the symptoms is larger than is generally appreciated. This amount will vary in individual patients, as will the level of metabolism at which maximum relief of symptoms is obtained and both must be determined by trial for each individual. The amounts which may be necessary and which may be well tolerated are shown in the case reports presented above. Symptoms of hyperthyroidism of course occur with too large amounts and over dosage should be avoided.

In contrast to true hypothyroidism,

thyroid substance is ineffective in cases of lowered basal metabolic rate due to other causes and may even make the symptoms worse. However, in those instances in which a true hypothyroidism exists in association with other conditions, such as the menopause, the administration of thyroid substance may relieve the part of the symptoms due to the hypothyroidism, as in case two. Such a result may be considered as evidence of the existence of more than a single disease.

SUMMARY

Hypothyroidism without myxedema is a more common condition than is generally appreciated and is not confined to regions where goiter is com-

mon. Failure to recognize the disease is due to the vague symptomatology and to the fact that the signs and symptoms of the better known hypothyroid state, myxedema, are lacking. The diagnosis depends largely on the detection of an abnormally low basal metabolic rate, but this observation must be interpreted with caution since all low rates are not due to hypothyroidism. In diagnosis, the nature of the response to thyroid substance, which is specific in true hypothyroidism, is of great importance and serves to distinguish between lowered metabolic rates due to hypothyroidism and those due to other causes. Illustrative case reports are presented.

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Ventricular Paroxysmal Tachycardia With Report of a Case*†

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PAROXYSMAL tachycardia may be defined as an abnormally rapid heart action with sudden onset and offset, and is divided according to the site of origin of the impulse which may be in the auricle, auriculo-ventricular node, or ventricle.

In general, the important point is to differentiate those examples of ventricular origin from others inasmuch as in them the prognosis is grave. There are several points of distinction clinically between auricular or supra-ventricular, and ventricular paroxysms, the former having a practically constant rate in the various attacks and being frequently stopped by vagal pressure,¹ especially left, the latter varying in rate between various attacks and even during the same attack,² and not controlled by vagus pressure.³ A few cases of ventricular paroxysmal tachycardia have been reported as due to digitalis⁴ (where the usual dosage was not exceeded), and quinidine,⁵ but in the absence of medication are usual-

ly due to serious myocardial disease, most commonly myocardial infarction,⁶ and have frequently been produced experimentally in animals by coronary ligation.⁷

Paroxysmal auricular flutter and fibrillation are not included and can usually be detected by clinical means, the latter by its irregularity increased upon exercise, the former by sudden halving or doubling of the previous rate, which if irregular, is usually less so upon exercise.

The one positive method of identification of ventricular tachycardias is the electrocardiogram,⁸ which, however, frequently offers difficulties. If the tracings show rapid rate with abnormal QRS complexes and P waves at a different rate, or absent, or if they show onset or offset, the diagnosis may be established. As a matter of fact it is believed that P waves may not be seen or their relationship established and the showing of the onset or offset of a paroxysm would usually be purely accidental. Premature contractions may be frequent between attacks and should show complexes similar to those present during them. A further point of confusion is the frequent abnormality of QRS in tachycardia of other origin.⁸

One reports a case of paroxysmal

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ventricular tachycardia with some hesitation as the diagnosis in many reported cases has been questioned by later writers. Thus Robinson and Herrmann⁶ accepted only six of sixteen as undoubted cases, Scott⁹ doubted the diagnosis in three of the four cases they reported, and Strauss¹⁰ stated only 63 undoubted cases had been reported to 1930. It is believed that but few, if any, cases have been reported having all the characteristic findings, but the following case apparently has, and is accordingly reported as such.

CASE REPORT

J. M., a white male; age 39; occupation, draftsman; was admitted to the Edward Hines Jr. Hospital, June 22, 1927, with a diagnosis of diabetes mellitus and decompensated heart. His complaints were "weak heart", difficulty in breathing, cough, rapid pulse, edema of practically entire body. Family history was negative. He had had the usual childhood diseases, and pneumonia eight years before. He was married, with wife and three children living and well. Smoked cigars, drank occasionally.

Present Illness. On May 5, 1927, while spading in his garden he had a heart attack, heart fluttered and was very rapid, and he felt weak. A second attack occurred a few minutes later but the patient felt all right after resting. During the night he became short of breath, and this had continued until admission, as had edema which developed shortly after the onset. He had been treated at another hospital for heart disease and diabetes, being on a diet and receiving 15 units of insulin daily.

Physical Examination. The patient was a well nourished and developed white male of 40, orthopneic, edematous and critically ill. There was diminished resonance at the lung bases and coarse râles throughout. The heart was apparently enlarged and the apex beat diffuse and wavy. Radial pulse was weak, regular, rate 150, blood pressure 146/90. There were signs of ascites and the scar of a recent abdominal paracentesis.

Laboratory Findings. Urinalyses showed a

very faint trace of albumin, occasionally a faint trace of sugar, specific gravity 1.010, occasional hyaline and granular casts and red blood cells. Twenty-four hour output varied from 600 to 3,500 c.c. Glucose tolerance test showed a delayed utilization, blood chemistry was normal, Wassermann test was negative. Roentgenogram of chest showed an enlarged heart with area of infiltration at the lung bases.

Course. There was slight fever from June 27 to July 3. The temperature varied from 36° to 38° C; pulse from 80 to 155, usually about 100. Pulse was noted as weak, sounds distant and feeble, on several occasions, and pulse was intermittent and irregular at times. Patient was put at rest, fluids restricted, and he was given digitalis and theobromine-sodio-salicylate. The edema practically cleared up and he was discharged August 2, considerably improved.

He was readmitted nine days later, on August 11, with edema again present, blood pressure then being 96/66. Diuretic regime was again instituted with ammonium salts and novasurol, and several doses of tryparsamide were given because of a history suggestive of syphilis and a 4 plus Kahn test. Two blood counts showed:

4,460,000 red blood cells, 60% hemoglobin
16,000 white cells, 60% polymorphonuclears;
4,360,000 red blood cells, 60% hemoglobin
14,200 white cells, 75% polymorphonuclears.
Mouth temperature showed a number of slight elevations, 37.2° to 37.4°; pulse varied from 60 to 120 with an average of 84. The edema cleared up and the patient was discharged on December 13.

He then worked steadily at a clerical position for about six months and was admitted for a third time, June 11, 1929, having been very weak, with pulse rapid, for the previous week. At that time the apex impulse could not be seen or felt; radial pulse was weak and irregular; apex rate 198 and apparently regular. The heart sounds were of fair quality and there was no edema. X-ray suggested pericardial effusion and showed a large pleural adhesion attached to the dome of the left diaphragm at junction of outer and middle thirds.

The patient was put on large doses of digitalis and on June 14 the rate was 186;

June 16, 1960; and June 18, 1960. There had been slight cough and the patient slept poorly but there was no edema, only moderate dyspnea and heart was not noticeably dilated. At that time it was felt that the form of the complexes on the electrocardiogram, the variation in rate, the long duration of the paroxysm, and the severity of the heart lesion, suggested a ventricular tachycardia, and that the sudden onset during exercise in a man of sedentary habits, short and inclined to obesity, with no history of previous heart disease, suggested a coronary lesion despite almost complete absence of pain.

Treatment was the same as before. There were a number of paroxysms of tachycardia, the terminal attack commencing on January 29 and continuing, with but a few hours interval, until death on February 11. There was edema of the lower extremities and heart sounds were tick-tack in character. On February 3 the bladder became distended,

the patient was unable to void and 1,000 c.c. of urine were obtained by catheterization. Congestive failure gradually increased, dyspnea being only moderate and the patient conscious almost until the end.

POSTMORTEM EXAMINATION

The heart was large, weighing 400 grams, dilated, particularly on the right side; there were pericardial adhesions anteriorly and considerable subepicardial fat; posterior wall of left ventricle was 15 mms. thick; anteriorly the wall from the aortic ring to the apex consisted almost entirely of scar tissue, 4 mms. thick, and exceedingly resistant. There was a mural thrombus in the lower part, 6 by 5 cms., 14 mms. thick at the apex, lamellated in the middle portion and light gray in color, and an infarct was seen some $4\frac{1}{2}$ cms. in diameter over the corresponding area externally. (Figure 1). There was no bulging of the scar. There was no evidence



FIG. 1. Left ventricle opened through posterior wall, showing scar tissue and thrombus in anterior wall.

of syphilis; the aortic ring showed only moderate atheroma, and coronary orifices, auricles and right ventricle appeared normal. The left descending coronary artery was followed downward for 7.5 cms. where it entered the infarcted area and was lost. Both this and the circumflex branch were thickened, with lining rough and irregular. The right coronary showed moderate sclerosis but its lumen could be traced to the septum. The anterior $2\frac{1}{2}$ cms. of the left ventricular surface of the septum showed scar tissue.

The left half of the diaphragm showed dense adhesions to the chest wall. The liver weighed 2,250 gms. and was typically nutmeg. The spleen weighed 170 gms. with poorly defined markings. There was much fat in the omentum and mesentery. There were 300 c.c. of serous fluid in the right chest.

Microscopic Examination. Section through upper part of the anterior wall of the left ventricle showed muscle fibers pale, and cross striations hazy, in places replaced by fibrous tissue. There was a round cell infiltration, the cells for the most part being lymphoid with a few large mononuclears. The small vessels present showed slight intimal thickening. The larger coronaries were not included in the section. Section through the infarcted area showed practically no identifiable muscles fibers, there being almost complete replacement by fibrous tissue. New capillaries were present. There was much round cell and mononuclear infiltration and one area of anemic necrosis completely surrounded by fibrous strands. Kidneys showed a severe nephrosis; lungs, a bronchial pneumonia; liver, spleen and lungs, chronic passive congestion.

Paroxysms of Tachycardia. In all seventeen paroxysms were noted, the shortest recorded duration being twenty minutes, and the longest, the terminal attack, was unusually long,⁸⁻¹¹ thirteen days. There was one of four and one of five days, and two of seven days. Abdominal, ocular and vagus pressure were ineffective. Levine³ has noted variation in the apical first sound

and irregularity in rate, the latter only being noted in this case, there being considerable variation of rate in different paroxysms and even in one which lasted for a considerable length of time.

A number of electrocardiograms were taken. The first (figure 2) was taken during the second admission, on August 24, 1927, and showed a rate of 214 with abnormal QRS, these being inverted in I and II, and T waves opposite in direction. P waves were distinct in III only, a P coming at the same rate as the QRS, immediately after the preceding QRS and 0.2 sec. before the succeeding one. In this case neither onset nor offset was shown so that according to Lewis⁸ the origin cannot be determined definitely and the QRS aberration may well be due to rapid rate, al-

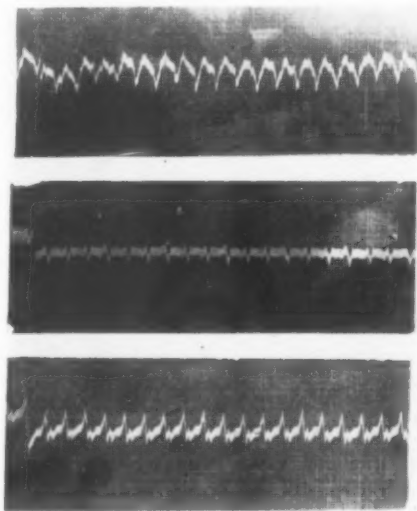


FIG. 2. Electrocardiogram taken August 24, 1927. Ventricular rate 214, showing well marked and abnormal P waves in lead III only, at the same rate as the QRS. Paroxysmal tachycardia of an indefinite origin although abnormal QRS and their similarity to some in figure 5 suggest a ventricular one.

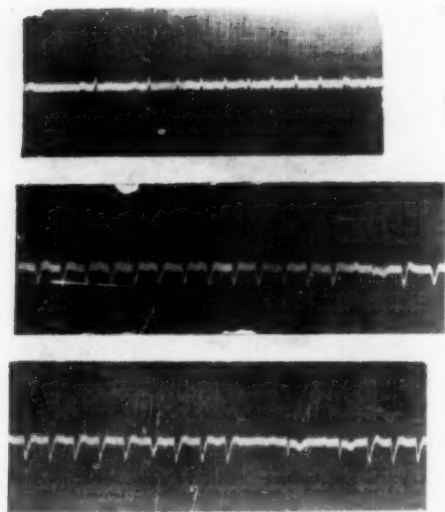


FIG. 3. Electrocardiogram taken June 17, 1928, showing a ventricular tachycardia. QRS complexes are aberrant, P waves may be distinguished in all leads at a rate unrelated to the ventricular, and all leads show normal complexes followed by periods of tachycardia, the first beat bearing the relation of a ventricular premature contraction to the preceding normal rhythm.

though similar ones are shown in a later tracing (figure 5). The tracing is very similar to one of Robinson and Herrmann's⁶ where P was distinct only in II and at half the ventricular rate. Figure 3 shows a paroxysm of tachycardia with aberrant QRS's of different form, rate 171, interrupted in all leads by normal complexes, and the auricular rate 83, P being easily distinguishable in II and bearing no constant relationship to QRS.

Figure 4 shows an electrocardiogram taken on January 24, 1929, and represents a paroxysm with a rate of 200, the QRS complexes resembling those of figure 3, but are very much higher, which is accounted for in part by improper standardization. Each alternate

T wave is high and is believed to represent a fusion of T and retrograde P. Figure 5 shows another tracing taken on September 18, 1928, and apparently represents a ventricular tachycardia with impulses arising irregularly in both ventricles and at various places in each.

A number of tracings were taken during normal rhythm, the first of which (figure 6) shows small QRS complexes, left axis deviation, inversion of T I. Electrocardiogram on June 18, 1928, (figure 7) shows a typical coronary T wave in II and III, the former coming off below the baseline and T I upright. Two days later T II and III were slightly inverted and then gradually disappeared. Both of these latter showed frequent premature contractions of ventricular origin, the QRS resembling those of paroxysms. According to Barnes,¹² these tracings would indicate occlusion of the right

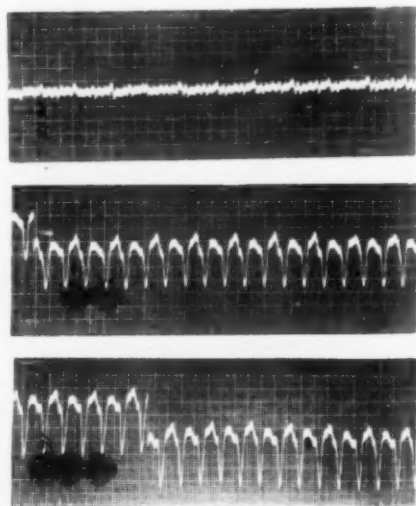


FIG. 4. Tracing taken Jan. 24, 1929, showing ventricular tachycardia, rate 200, aberrant QRS. In II and III, alternate T waves are high due to super-imposed retrograde P waves.

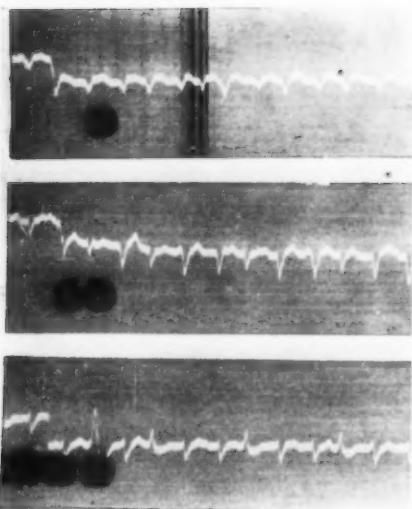


FIG. 5. Electrocardiogram taken Sept. 18, 1928, showing complexes arising irregularly from various points in both ventricles.

coronary artery with infarction in the posterior and basal portions of the left ventricle, but in the present case the left artery was occluded and the anterior wall infarcted.

The Relationship of Medication to Tachycardia: As either a causative or therapeutic factor, this is a matter of some doubt. Paroxysms occurred while the patient was receiving digitalis in small and moderate doses, quinidine, both digitalis and quinidine, and in absence of medication. One attack stopped on the second day two hours following 0.2 grams of quinidine, the second one after two such doses, and the third attack when several doses of 0.4 grams had been given four hours apart. The terminal paroxysm was apparently uninfluenced by even fairly large doses of quinidine, although these were small compared to those recommended by Levine and Fulton¹³ who restored normal rhythm in eight of ten

cases. They strongly recommended its use, giving as much as 1.5 grams every five hours, and Strauss¹⁰ stated that quinidine was effective in all sixteen cases collected by him in which it was tried. Digitalis seemed to have but little effect upon the heart failure.

The evidences in this case for a ventricular origin of the tachycardia are etiological; coronary occlusion with myocardial infarction, as established by autopsy; repeated attacks of tachycardia with varying rates and abnormal QRS complexes; P waves appearing at different rates, related or unrelated to those of the QRS; premature contractions showing complexes resembling those during tachycardia. The patient's age, 39, and practically complete absence of pain are considered unusual in coronary occlusion, but the customary leukocytosis, fever and low blood pressure were present; no physical signs of pericarditis were obtained, although this was found at

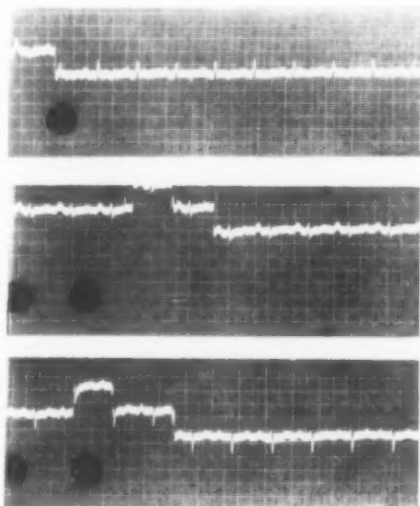


FIG. 6. Electrocardiogram of Oct. 14, 1927, showing small QRS, left axis deviation, P-R interval of 0.2 sec.

autopsy. The association with diabetes is not uncommon. It seems probable that the patient had his initial occlusion at the time of the onset, although electrocardiographic evidence is lacking; and later, subsequent ones with extension of the infarction. Autopsy findings showed that the lesion was of long standing at least.

SUMMARY

A case is reported of paroxysmal ventricular tachycardia with numerous attacks, occurring in a white male of 39, with death occurring during tachycardia one year and eight months after onset, the final paroxysm being of thirteen days duration. Numerous electrocardiograms were taken and autopsy confirmed the diagnosis of coronary occlusion with myocardial infarction.

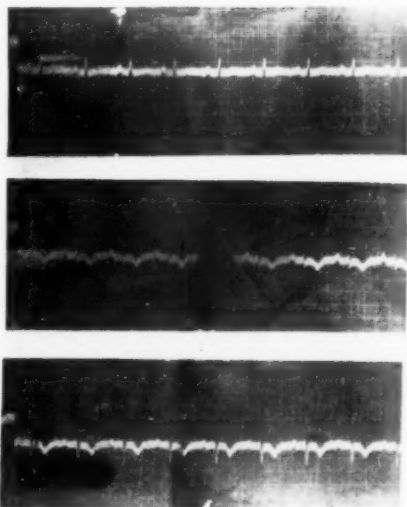


FIG. 7. Electrocardiogram of June 18, 1928, showing inverted coronary T waves in II and III with low take-off in former. QRS about same as in figure 6. T I now upright.

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Control of the Tick Borne Diseases—Methods and Economics*

By NOXON TOOMEY, M.D., F.A.C.P., *Palmyra, Mo.*

A SPECIES of tick was the first arthropod proved to be a vector of disease caused by microgametic life. The relation first discovered did not involve the human body, but that of cattle. However, the discovery did afford the foundation for suppositions, based on analogy, that were soon extended to the theory of infectious diseases in man, with results that have afforded a scientific insight into the transmission of a great many of the most serious infectious diseases of man.

Apart from any consideration of ticks as possible vectors of disease to man, the diseasecommunicating tick of cattle was at once recognized to be an economic liability of almost measurable degree. Efforts to free cattle of ticks, and to keep them free, became therefore an important and actively prosecuted problem of veterinary sanitation. Tick eradictory measures were consequently devised and studied in relation to cattle infestation, but were at first prosecuted only on the cattle grazing plains of the Southwest. For a long time the idea of tick control was virtually restricted to the requirements of profitable animal husbandry.

In 1902 a species of tick was sus-

pected by L. M. Wilson and Wm. M. Chowning as being the vector of spotted fever of the Rocky Mountains.⁶ Although their epidemiological investigations served to draw attention to the wood tick as a possible vector of spotted fever, they did not succeed in establishing the theory, which was tentatively accepted by John F. Anderson in 1903, but challenged and denied by Charles Wardell Stiles in 1904.²⁰

In 1904, Ross and Milne, in Uganda, and Dutton and Todd on the Congo River, discovered that the cause of African relapsing fever in man is a spirochete which is transmitted by the tick, *Ornithodoros moubata*, Murray.³⁴

In 1905, L. P. McCalla and H. A. Brereton transmitted spotted fever of the Rocky Mountains to man by means of tick bite (attachment) but their observations did not become generally known until they were published in 1908.

In 1906, W. W. King, and later in the same year, H. T. Ricketts transmitted spotted fever of the Rocky Mountains to guinea pigs.⁸³

With ticks proven to be a vector, and probably the sole vector of spotted fever, their important relation to that very fatal disease in the Bitter Root Valley of Montana became the

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modulus for solving not only a very serious local health problem but a possible means for removing a very serious economic loss. The latter was entailed due to the justifiable fear of the disease entertained by old settlers and immigrants who refused to remain on the west side of the Bitter Root Valley. Thus hundreds of thousands of acres of exceptionally fertile land were kept from being settled and tilled uninterruptedly. The economic loss was so great that attempts at tick eradication in the Bitter Root Valley were anticipated as being profitable even at the expense of considerable experimentation and systematic, controlled efforts.⁶³

As a result, therefore, of economic pressure as well as humanitarian and public health considerations, there has been in Montana since 1911 a continuous scientific study and practical prosecution of tick control measures, with particular final reference to man, such as has never been attempted elsewhere. Thus, although we are indebted to veterinarians for the first studies directed at tick eradication, in its present day aspect we are almost entirely indebted to the Montana investigators and control officers for our current knowledge of the problems and methods involved in the control of the tick borne diseases.^{62, 63, 64}

Commenced initially with sole reference to spotted fever of the Rocky Mountains, the tick control program has become of constantly increasing significance in ratio with the number and importance of the several other diseases that have in recent years been demonstrated to be transmitted by

ticks, and to the evident widening dispersion of some if not all of them.

The diseases transmitted by ticks are spotted fever, tick paralysis, tularemia, American mountain tick-fever, certain indolent cutaneous ulcers of undetermined character, and, although apparently not in Montana or adjacent states, a relapsing fever of spirochetal origin.

Spotted fever, then considered to be cerebrospinal meningitis, was probably first described by Henry F. Hereford, M.D., of Gold Hill, Nevada, in Thomas M. Logan's article entitled "Report on the Medical Topography and Epidemic Diseases of California" published in the *Transactions of the American Medical Association* for 1866 (Vol. XVI, pp. 497-569). It was not however until the publications of Maxey, McCullough, Wilson and Chowning,⁶ Anderson, and Craig¹⁷ that it became known to investigators as well as local physicians.

Tick paralysis was first described by Seymour Hadwen from British Columbia in 1914.¹ It was first recognized as being of concern elsewhere (Idaho and Montana) in 1923 by James Dade, chief inspector of the Idaho State Sheep Commission. The disease has been subsequently studied by R. R. Parker and W. J. Butler.

Although *tularemia* was first shown (by the studies of 1910 to 1915) to be transmitted by the bite of the blood sucking deer fly, *Chrysops discalis*, it was later, in 1923, proven to be transmitted also by the wood tick, *Dermacentor andersoni*, according to demonstrations of R. R. Spencer and R. R. Parker.² The tick borne tularemia has also been studied by R. R. Parker, R. R. Spencer and Edward Francis.³

American mountain tick-fever was first described clinically in 1850 but without reference to being transmitted by ticks. Unaware of the earlier reports, Charles F. Kieffer in 1907 associated it with tick bites under the name of intermittent tick-fever. Since then it has attracted no notice except briefly in connection with spotted fever by F. E. Becker and by R. R. Parker, until the studies of the writer showed it to exist independently as a definite and distinct disease entity.^{8, 9, 10}

The tick borne relapsing fever of *spirochaetal* origin, first reported from Africa, has a related form in parts of North America (Texas) and probably in Mexico, a known vector being the tick *Ornithodoros turicata*.⁴

Thus there are in North America five well known specific diseases transmitted by ticks, and also certain indolent skin ulcers of unknown micro-gamic origin. But, as will be pointed out elsewhere, it is not to be supposed that a tick control (eradication) program of universal applicability can be worked out for all tick borne diseases and for all localities, as local circumstances and requirements differ very greatly, even radically. Hence each tick borne disease and tick infested locality will continue to have its own more or less peculiar problems, but whatever measures are successful in diminishing the incidence of a certain species, or family of ticks, will necessarily have some effectualness in reducing the prevalence of all the diseases transmitted by that species or group of species.

CONTROL MEASURES

Historically considered, tick control measures as related to the diseases

transmitted to man, had their inception in the general collective experience on the effect of avoiding certain localities at certain times of the year (avoiding exposure), and on the effect of the clearing of lands and of grazing, upon tick destruction.⁸⁸

The above mentioned measures being found helpful but not sufficient the first studies in Montana were devoted to rodent destruction and the application of the well known dipping of live stock as had been practiced for many years in the control of the tick fever of cattle.⁶⁷ The quarantining of stock, and the dragging for ticks were added, and rodent destruction became prosecuted in more ways.⁸⁵ Lastly have been the introduction of tick parasites,¹⁷¹ and the use of a vaccine for one of the diseases (the Spencer-Parker vaccine for spotted fever).^{169, 190}

The measures will be studied systematically rather than in their order of introduction. It will be observed, however, that the two sequences coincide to a considerable extent. In this connection it must be remembered that it was almost from the outstart realized that no one or two methods alone were dependable but that optimum results were to be arrived at by finding the combination of procedures that gave the lowest infected tick incidence for the cost involved.^{94, 95, 105} The methods available will be considered in the following order:

Avoidance of Exposure

Hygiene (frequent inspection) of person
Periodical exodus

Tick Destruction

Clearing land
Grazing
Dragging
Dipping of live stock

Quarantining of live stock

Tick parasites

Rodent Control

Trapping

Shooting

Poisoning

Preventive Inoculation

Avoidance of exposure consists of systematic periodic search for ticks on the body and clothing of those who must enter infested districts, and the actual avoidance of infested areas during the tick season, the latter being from March 1 to July 15. Safety suggests, however, a removal out of infested districts from about February 15th to August 1st. The wearing of tick-proof clothing is helpful, but apt to be unbearable in summer time, and is at no time dependable, so should never lull the wearer into a false sense of security.

Where spotted fever is known to have a high mortality, periodical exodus of the rural population is still actually much practiced, but in the older control districts it is much less practiced than it used to be, and especially lately since the introduction of the spotted fever vaccine.

As to the conduct and value of these methods:

Systematic periodical search for ticks on the body and clothing would be extremely valuable if carried out rigorously but the method is subject to the human elements of indifference, laziness and incompetence. Search should be thorough and at intervals not greater than twelve hours.

For thorough inspection individuals require assistance, hence it is best for groups to pair off so that each individual can have someone to act as assistant and inspector; this plan being additionally valuable in proportion to the mutual encouragement and

emulation it develops. The method is especially adapted for short camping trips and brief excursions into the mountains by trappers, range officers and lumbermen, but is often compromised by inadequate lighting facilities at night. Due to the human element, the method is impractical for prolonged periods, hence can not be included in a program devised for permanent residents. For health programs among tourists, campers and other casuals to infested districts, the twelve hour inspection and deticking method should be made the foundation of a prevention program. It has the advantage of placing no cost upon counties or the State, but does somewhat increase mental unrest. Periodical inspection is not of value against tularemia, American mountain tick-fever, the indolent ulcers, and spirochetal relapsing fever as a very brief period of attachment is sufficient to infect the individual with any one of those diseases, but for tick paralysis and spotted fever it is of value as attachment for about one and one-half hours is necessary for the tick to transmit spotted fever.

Detailed instructions concerning the character and arrangement of wearing apparel to diminish tick penetration, the habits of ticks, the preparation of camping grounds and sleeping arrangements, the search for and removal of ticks, and the treatment of tick bites has lately been published by R. R. Parker.²²⁴

Periodic exodus from infested districts during the tick season protects only for the time being and has no cumulative effect. It is economically expensive, but in dangerous uncontrollable districts it may be the only feasible method available.

Periodic exodus seems to have no appreciable effect in spreading ticks or the tick borne diseases, but it can not be denied that it has a slight tendency in that direction. It places virtually no direct expense on counties or the State but it does do so indirectly as it very noticeably depreciates business and the economic welfare of the areas affected. It contributes to mental unrest. Efforts should be made to make it unnecessary, and it should

not be part of an advertised program in a well controlled area, but as an emergency measure and for heavily infested areas that cannot economically support a control program the periodic exodus should not be discountenanced. During the period of exodus the method is of course effective for all of the tick borne diseases, but the method is, on an annual basis, not equally effective for all of the diseases as the mountain tick-fever, tularemia and perhaps tick paralysis are known to have a longer season than spotted fever, being not infrequently observed in August and occasionally in September.

We consider now the methods that largely comprise county or State control programs. They are methods that cannot for the most part be carried out effectually without county, State and even Federal assistance, coordination and control. They may be grouped under the headings of tick destruction, rodent extermination, and the use of prophylactic vaccination. All are necessary and economically justifiable for the most effective program in a thickly populated, heavily infested area but all are not equally available, economically, in thinly inhabited areas of low ground value.^{100, 116}

Tick Destruction

The clearing of land, especially in the more intensive types of farming, has a very marked effect in diminishing tick incidence but there is no reliable data as to what extent it does so. It has the unique advantage that it does not add an extra labor charge to the owners or tenants of farms, nor any additional cost to the county or State. It should be included as much as economic conditions warrant in any program for tick control.

Cattle grazing does not decrease tick incidence unless combined with dip-

ping. In fact without dipping it has some effect in increasing tick incidence and in spreading spotted fever.²¹¹ Combined with systematic and effective dipping it slightly decreases tick incidence.

Sheep grazing, at one time thought to be a valuable tick control measure,⁷⁹ has been shown to be of only limited value.⁸¹ It is chiefly of service on uplands, where it has a definite place in the program due to the lessened applicability of other methods in those places.⁸⁸

Dragging is a valuable method yielding quick results and particularly adapted for partially cleaning up small areas quickly. It does not have, however, sufficient cumulative effect to warrant a high labor charge. On the average, over a large project area the labor devoted to dragging should be kept to about one-fourth of that devoted to ground poisoning. It has the advantageous bi-effect of yielding thousands of ticks for experimental and other laboratory purposes such as the production of spotted fever vaccine.

The dipping of live stock is a useful method for tick control and yields results as quickly as dragging, but it also has no decided cumulative effect.⁶⁸ Granted proper facilities, the cost of dipping is not great compared to its value, but it has the disadvantage that it requires an appreciable capital outlay for dipping vats, and cannot in northern climates be invariably carried out as often as it should be, due to weather conditions. Dipping should be carried out preferably weekly, or at least every two weeks.

Dipping imposes some extra labor but farmers take to it readily provided the dipping vats are of convenient access. Beyond

the range of convenience there is noticeable indifference to dipping, the hand picking of ticks from cattle being more popular.¹³⁷

Stock dipping can not be carried out as economically under semi-range and foot-hill conditions as where the area is entirely range land. However the dipping of live stock in infected areas has a definite place in tick control as it is available in foot-hill country where rodent control cannot be so successfully practiced. In those places wild animal life meets with domestic animal life and it naturally follows that dipping will do more good in such districts, although the amount of good it does in such districts is questionable.²¹¹

The practice in Montana is to exempt milch cows from dipping provided the owner keeps them free from ticks by hand picking or by spraying with an arsenic-pine tar solution containing 0.22% arsenic trioxid.

Dermacentor andersoni appears to be somewhat more resistant to arsenical dips than the cattle tick, and so it has been found best to add a soft soap-kerosene emulsion to the arsenical, following the Watkins-Pitchford formula.⁵ By this addition the destructive effect of the material on the tick is increased and the caustic action on the host is reduced. This formula is as follows, English measure: Arsenite of soda (80 per cent arsenious oxide), 8.5 lbs.; soft soap, 5.5 lbs.; kerosene oil, 2 imperial gallons; water, 400 imperial gallons. It is important that the proper strength of the solution be maintained at all times, both to secure efficiency in tick destruction and to avoid injury to the stock.⁶ A simple outfit has been devised by the U. S. Bureau of Animal Industry for determining the percentage of arsenic present.⁷

The quarantining of stock during the tick season does not reduce the incidence of ticks in the infested areas. The measure was introduced to prevent the mechanical carrying away of ticks from dangerous areas; in that respect it is undoubtedly very successful. Animals that must be shipped during the tick season are released from quar-

antine only after being dipped and inspected by a state officer for freedom from ticks.^{137, 211}

The cost of enforcing quarantine is nil or very trifling as the duty of enforcing it is merged with the duties of the brand inspectors.

Tick Parasites

The high mountain reaches being the fountain head and impregnable fortress of both ticks and wild animal life, they are unassailable by the control measures already mentioned, including the rodent control measures to be mentioned. Hence a new method is necessary that will offer some prospects of destroying ticks above the foot-hills.¹⁸³ In hopes that they might find the ticks in their inaccessible abodes, the tick parasite, *Ixodiphagus caucurtei* du Buysson, a minute chalcid fly was imported into America from France in 1926.¹⁸⁴

A great deal of work has been done by Cooley, Morton and Kohls on studying the tick parasite, *Ixodiphagus caucurtei*, with particular reference to its artificial propagation,¹⁸⁵ its suitability for the climate of Montana, and its liberation at strategic points.¹⁸⁶

The chalcidoid fly has been reared in large quantities by the Montana State Board of Entomology in its laboratory at Hamilton, Montana. These minute flies have been liberated to the extent of about two million specimens during the past four years (1927 to 1931). Twelve colonization areas have been selected in western Montana and seven in eastern Montana. In 1929, one year after the release of 82,200 in the Lick Creek area, 250 engorged nymphal ticks were secured from 108 squirrels. Upon incubation it was found that 14 (7.5 per cent) of the ticks were parasitized. Equally as encouraging results were not obtained in 1930, but the data obtained were too limited to

warrant the drawing of conclusions. Although it is much too early to determine what will be the ultimate value and results of tick parasite liberations it may be said that all theoretical considerations and practical observations are distinctly encouraging at the present time. Obviously it is impossible to equate cost with results at this time but the work being done along the line of tick parasites has the very great advantage that it is constructive and cumulative in value, and is available in regions where other methods of tick control are not available.

Rodent Extermination

The shooting of rodents should be encouraged by permitting an open season at all times as far as rodents are concerned. Shooting does not, however, sufficiently reduce the incidence to warrant the paying of a bounty unless of a very trifling character. It should be an incidental but not a main effort of county and state employees as it is not sufficiently productive of permanent results to justify the cost of time and material required.

Trapping, likewise, should be a method available to the public at all times, and one employed by control officers incidentally to other field work. It does not kill enough immature animals to have much cumulative effect, hence does not warrant a high labor cost or the paying of more than trifling bounties.

Shooting and trapping are of most value for clearing up very small areas for brief periods, and are of chief applicability for certain points with a brief tourist season.

Rodent extermination by means of poison has the most cumulative effect as it kills the fair proportion of immature animals before they have opportunity to breed. It is not, however, as productive of quick results as are shooting and trapping. Poisoning of

lands can not be carried out discursively for best results but should be carried out in a planned and systematic manner, extending concentrically from strategic points. The use of poison is especially adapted to plains and low foot-hill areas but is not feasible for mountain sides. The poison placed on or near grazing lands occasionally kills live stock as well as rodents, hence farmers are at first usually actively opposed to its use. It can be shown, however, that the loss entailed is comparatively trifling. Where there are means for compensating farmers for their loss, opposition to rodent control by means of poison becomes less in time as eventually the farmers' live stock is considerably improved by being kept free from ticks.

The Montana experience has been that of 41 cases of stock poisoning reported in the seven years 1923 to 1930 (over an area of about 425 square miles) investigation resulted in a settlement being made in 20 (about one-half) of the cases. The average per annum cost of settlement for the five years 1924 to 1929 was \$120, and represented the loss of six horses, eight cows, nine pigs, nine sheep, and four geese for the five-year period, or about three large and four small animals per year. The above low loss of stock and cost to the State could not have been accomplished, however, without experienced labor in placing the poison and without careful investigation of claims (including toxicologic analysis of viscera of allegedly poisoned animals). Since strychnine has lately been replaced by calcium cyanide under certain circumstances, the loss of live stock will be still less.^{170, 189}

The effect of the systematic annual and partly semi-annual use of poison in the Hamilton to Missoula, Florence, and Lolo districts of Montana has been to reduce the rodent population as observed on a measured trip (at the same time of the year) from 194 in 1924 to 16 in 1930.

The cost (time and material only) of rodent control by poison has averaged \$0.02681 per acre per year for the four year period 1927 to 1931. This is equivalent to a cost of \$5.362 per year for a 200 acre farm, or \$26.81 for a five year period. After the latter has been established the control by poison can be maintained for about \$5.00 per year, or \$2.50 per 100 acres if done intelligently, systematically and on a large enough scale.

The combined amount of land treated in the Ravalli County and Missoula County control areas in 1927 was 246,697 acres and in 1930, 271,533 acres. The latter is equivalent to about 425 square miles or a strip eight miles wide by 53.1 miles long. The average total annual cost for the area was \$7,280, representing a labor of 1,456 eight-hour days or the employment of sixteen men for ninety-one days a year. The average number of baits per acre were 4.02 for Ravalli County and 1.22 for Missoula County. A trifle over one-third of the land was poisoned twice a year. The amount of materials used in 1930 were 6,686 quarts of poisoned grain and 5,261 pounds of calcium cyanide.

The poisoned grain is made by mixing crushed whole oats, 40 quarts, with a solution of molasses (4 pints of molasses and one and one-half quarts of water) in which has been dissolved a mixture of strychnine, 5 ounces; saccharine, 5 drams; gloss starch, 2.5 lbs.; and sodium bicarbonate, 5 ounces. The dry powders are first mixed together and then dissolved in the warmed solution of molasses. The whole is then poured over the oats and rapidly mixed by hand. Rubber gloves should invariably be worn and the hands thoroughly washed after mixing the poison into the grain. The grain-poison mixture is then spread on canvas or muslin racks until it is thoroughly dry.

About one teaspoonful is placed usually on the surface of the ground at the rear of the rodent's hole or burrow. It should be either spread out over the ground or placed in a small shallow depression where it will be accessible to the rodents but not attract the attention of large domestic animals.

Prophylactic Vaccination

Recognizing that tick eradictory methods and rodent control measures

were but partially successful at best, even when intensively practiced, and that no method except the frequent periodic inspection of the body for ticks was available against spotted fever in areas beyond the controlled areas, the desirability of artificially immunizing people against spotted fever was at once apparent. Accordingly, R. R. Spencer and R. R. Parker at the Montana Laboratory for the Study of Insect-Borne Disease, Hamilton, Montana, developed a vaccine of considerable protective value against spotted fever. The vaccine is prepared solely by the U. S. Public Health Service at Hamilton, Montana.

At present spotted fever is the only tick borne disease for which there is a method of prophylaxis by means of inoculation.

The vaccine for active immunization against spotted fever is of the attenuated virus type. It is to be used before the tick season in two doses with a week's interval between doses. It should be repeated annually. The annual inoculations seem to have a slight cumulative effect.

About twenty-five thousand persons have been inoculated with the vaccine during the period 1925 to 1931 inclusive. Each year there has been an increasing demand for the vaccine and it has been necessary to increase production accordingly. The amount manufactured was doubled in 1929, again in 1930, and again in 1931. The heaviest call is from Montana, Wyoming, Idaho, and Oregon, the last named state using the most in 1930.

From the results of a two year test (1926 and 1927) made in southern Idaho against the mildest type of the disease and another test against the most virulent type, which had been in progress for four years in the Bitter Root Valley, the following conclusions were expressed:—that against the milder type of

infection the vaccine usually afforded full or nearly full protection, while against the highly virulent type the degree of protection was usually sufficient to cause a marked amelioration of the customary very severe symptoms and to insure the recovery of most cases. No further test was deemed necessary so far as the mild types were concerned, but additional data seemed desirable in regard to efficacy against the virulent type. Therefore, complete record keeping in the Bitter Root Valley has been continued. The full six years' data for this valley (1925 to 1931) show that since the beginning of the test 3,578 persons have been vaccinated, of which nine have received vaccine in six different years, 64 in five years, 143 in four years, 257 in three years, 555 in two years, and 2,550 once. During this test period 46 persons have become infected with the highly fatal local strains. Of these, 30 were in non-vaccinated persons and 16 among those vaccinated. Of the 30 nonvaccinated cases, 22 died; of the 16 vaccinated only three. The death rate in the former group was 73.33, in the latter 18.75, thus showing a marked reduction in mortality in favor of the vaccinated cases.²⁰⁹

The cost of manufacture of the vaccine has been thought to make its manufacture commercially infeasible. While this fact was undoubtedly true in the experimental stage, there seems reason to suppose that with demonstrated value, and larger production, the manufacture can now be put on a commercially justifiable basis.

COMPARATIVE ECONOMICS

Total economics cannot be given accurately at the present time as a true pro rata cost of the tick parasite efforts and the prophylactic vaccination campaigns cannot be more than approximated.

Of known costs, rodent control by poisoning of land places an average charge of \$5 per 200 acres, dragging about one-fourth as much again, dipping about one-half as much again and general overhead and administration

charges for these control measures, an additional one-fourth so that the annual charge for these measures is about \$10.00 per 200 acres (or average farm family), the per capita cost being about \$2 per year. Assuming vaccination to be on a commercial basis it could under average conditions be carried out on a cost basis for about one dollar a year for urban inhabitants and two dollars a year for rural inhabitants, assuming organized effort and full cooperation of the inhabitants in reporting to conveniently placed temporary stations (physicians' offices, public health booths, etc.).

Thus for all tick and spotted fever control measures other than the tick parasite investigations there is in heavily infested but well controlled areas an annual cost (averaging rural with urban) of about \$3.50 per capita or \$17.50 per average family on a 200 acre farm or \$8.75 per 100 acres. General research work would bring this up to \$10.00 per 100 acres per year. Compared with many other reclamation projects (drainage districts, irrigation districts, etc.) this is not an economically unjustifiable charge for land of good average productivity, although it must be remembered that it is not a temporary charge for a permanent or semi-permanent improvement but is an indefinitely necessary annual charge with only slight to moderate cumulative effect, and none that would endure more than briefly if all control efforts were relaxed.

The above costs are obtained under reasonably favorable conditions. Under but slightly less favorable conditions they might be two, three, or four times as great. Hence, unless land is of ex-

ceptional economic value it can not afford to carry the burden of much control work of present type spent on difficultly controlled adjacent uplands of low economic value. Also, it should be remembered that initial efforts are always more expensive than subsequent maintenance efforts. Hence an initial three to five year tick control program would have to provide an average annual charge of perhaps \$12 to \$14 per 100 acres, and under some conditions (transportation facilities, etc.) even more. Mountain sides and other timber land obviously cannot bear one-tenth such a cost, and yet they are the fountain head, and so far unassailable fortress, of tick life. It is on account of these considerations that efforts towards propagating tick parasites are so very important. On the other hand, if an individual can be effectively immunized against a tick borne disease, the concern as to tick incidence is proportionately reduced, at least as far as that disease is concerned.

Where dangerously infected areas have a recreational appeal of a dispersive sort it should be the policy of the responsible control officer of the area to close certain parts of the dangerous area to the public, which will thereby concentrate recreational activities in a locality or localities that can be controlled with fair prospects and economic justification.

RESULTS OF TICK CONTROL MEASURES AS TO REDUCING MORBIDITY IN MAN

Tick control measures have decided value in relation to improving animal husbandry (tularemia, tick paralysis, etc.) and these valuable by-effects should be kept in mind. The purpose

of this article is, however, to consider only the demonstrated effect of tick control measures in reducing disease in man.

Spotted fever as existing in the Bitter Root Valley affords a valuable yardstick on account of the reliable statistics that have accumulated on the subject during the past thirty years.

From 1913 to 1929 there were 113 cases of spotted fever in Missoula, Ravalli and Granite Counties (the Bitter Root Valley) Montana. Of these, 48 cases (42.5 per cent) occurred in the older control districts of the Florence, Stevensville, Victor, Hamilton and Gold Creek areas, all in Ravalli county.²¹² In these areas combined, the following number of cases occurred:

In 1913 and 1914	14
1915 and 1916	7
1917 and 1918	0*
1919 and 1920	5*
1921 and 1922	8
1923 and 1924	6
1925 and 1926	3
1927 and 1928	2
1929 and 1930	1

*The reduction in these years was very probably largely due to the diminished male population on account of the men being away in army service during the World War.

Comparing the quadrennium 1913-1916 with its 21 cases against the quadrennium 1927-1930 with its 6 cases we find a reduction of morbidity in these areas from 100 per cent to 28.6 per cent (actually the reduction was to under 25 per cent of the old uncontrolled rate, as the first four years, 1913-1916, showed some effect of tick control measures).

On the same basis, for the whole valley the reduction would be from 38 cases in 1913-1916 to 10.87 cases in

1927-1930, or 27 cases less during a four year period. As the death rate for all unvaccinated cases in this valley has for thirty years been 76.81 per cent, it is safe to say that of the 27.13 fewer cases, 20.84 cases (76.81 per cent) represent lives saved, or a trifle better than five a year. Placing for economic purposes a nominal value of \$2,500 per average human life, this would represent a saving of \$13,000 a year, which with \$2,000 for critical illness and temporary loss of earning power, for six others, would in an economic way well balance the total known cost of control measures, which was on the average of ten cents per acre for an average of about 150,000 acres (well under that number before 1927, up to 271,500 since then) or about \$15,000 a year.

While these figures do not represent any "juggling" it is not to be understood that they are meant to represent more than an *approximate* appraisal of economic results. At that, however, they do indicate that even on a crass economic basis it is evident that all moneys spent for tick control measures have been spent justifiably, on a human morbidity-mortality basis alone.

In addition there has been, besides improvement in quality of live stock, an enhancement in land values that alone would have more than justified the cost of all tick control measures. Thus it is safe to say that over an eighteen year period of tick control, the fundamental land values of the Bitter Root Valley have appreciated at a rate greater than an annual average of \$50,000.

To the known savings effected in connection with spotted fever should be added the diminished incidence of the other tick borne diseases. The amount of diminution of the latter is not known, as only recently have tularemia and tick paralysis been recognized in man, and the American mountain tick-fever has not attracted attention in the Bitter Root Valley in recent years. As already remarked, the distribution of the tick borne diseases varies somewhat according to locality, hence a tick reduction program elsewhere might not be as economically productive of good as it has been in the Bitter Root Valley, even though the other tick borne diseases were almost totally eliminated, as collectively they do not seem to be of an economic importance equal to that of spotted fever.

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The Etiology of Colds*

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THERE is a growing conviction that colds are due to a specific filtrable virus. This conclusion is of such importance that the evidence leading up to it needs to be examined critically. The evidence in favor of the view is two-fold. First, experiments have been reported which appear to show that colds can be transmitted to humans and to chimpanzees by bacteria-free filtrates of nasopharyngeal secretion obtained from persons suffering from colds. Secondly, it is supposed that there is sufficient evidence to show that ordinary bacteria, while admitted to be pathogenic, are in no way concerned in the primary etiology of colds. It is the purpose of this paper to consider the nature of this dual evidence.

TRANSMISSION EXPERIMENTS WITH FILTRATES

The experimental method relating to the transmission of colds with bacteria-free filtrates of nasopharyngeal secretions is simple in principle. The filtrate is instilled into the nasopharyngeal passages of volunteers who are kept under observation to determine whether or not they develop a cold. The interpretation of results however is full of pitfalls, for there are no cri-

teria of successful transmission other than clinical symptoms. These clinical symptoms are very indefinite both in kind and in degree. Anything between a transient nasal discharge and pneumonia may be so classified, possibly correctly so far as we know at present. No one would attempt to define the severity of headache, the amount of sneezing, the degree of hyperemia of the mucous membranes, the severity of sore throat, or the volume of nasopharyngeal secretion necessary to establish the diagnosis of a cold, or even to say which of these symptoms need be present. Yet, it is solely on such symptoms that the interpretation of transmission experiments depends. Experimenters cannot protect against error by disregarding mild symptoms; this recourse would still leave the etiology of mild colds unsolved.

Further, suggestion plays a great part in the subjective (possibly also the objective) symptoms of the volunteers. Only those who have served as subjects for such experiments, as I have done, know fully the potent influence of this factor. The curiosity and expectation are intense; every breath is carefully drawn in to detect possible nasal obstruction; every sneeze is followed by an anxious waiting period for other sneezes.

Dochez¹ and his co-workers found

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this factor of suggestion so powerful that it was necessary to use "various ruses, such as nasal injections of sterile broth, collection of nasal washings for culture and equivocal statements" in order to keep the subjects in ignorance. One of their subjects in particular appeared willing to develop or not to develop a cold according to what he thought was expected of him. Also, he was willing and anxious to change his symptoms if he thought that his first impression was an error. In view of these considerations, and the well known tendency of humans to develop respiratory symptoms at any time, it is extremely doubtful whether such symptoms¹ as a mild cold "in which sore throat, laryngitis and cough with a moderate amount of sputum were conspicuous" or "a simple uncomplicated mild cold" can be given sufficient weight on which to form a final judgment. This is particularly the case, since no volunteers submitted to the same psychic influences were reserved as controls.

Long² and his group also recognized the possibility of error as a result of the psychic reactions of the subjects. During a five day period the subjects were given several nasal instillations of broth in order to keep them in ignorance. Yet, at the end of this time, they all received instillations of filtered nasopharyngeal secretions. The control group was the general population of Baltimore, persons living under entirely different conditions, not elaborately hospitalized like the volunteers, and certainly not subjected to "careful examinations of the nose and throat by several observers" as soon as they complained of symptoms.

Besides the factor of suggestion, the interpretation of symptoms following the nasal instillation of filtrates is rendered all the more difficult since, as stated by Dochez,¹ the filtrates are irritating to the mucous membranes and cause in "practically all cases, negative and positive, some slight stuffiness of the nose, a little sneezing, and occasionally slight headache". This is further complicated by the fact that the subjects received intranasal instillations of broth, likewise irritating, in the days immediately preceding the test inoculations. No one apparently has attempted to determine the effect of this repeated instillation of irritating liquids on nasal symptoms in humans. The powerful effect of irritating chemicals in causing nasal symptoms in rabbits was shown by Carrol G. Bull.

The great importance of this subject for human welfare requires that such experiments be better controlled. Larger groups should be used, say 50 to 100, with an equally large control group. It is obviously unnecessary to hospitalize these persons if they are kept under the same living conditions. Preliminary broth injections are also unnecessary in an adequately controlled experiment. However, the subjects and also the observers responsible for the diagnosis of colds should be in complete ignorance as to the nature of the instillations used. I know of no place where such an experiment could be satisfactorily performed outside of the military service.

Unfortunately, such an experiment even with a markedly significant difference between experimental and control groups would not settle the problem by proving that colds are due to a filter-

able virus. There is another objection to be answered. Filtered nasopharyngeal secretions contain a number of substances in solution, substances derived from micro-organisms as well as of human origin. It is more than a theoretical possibility that the coryzas following the nasal instillation of such substances represent an allergic response by the nasal mucous membrane. There is no more reason to consider the coryzas produced by such instillations as due to a filtrable virus than there is to consider the ophthalmic reaction following the instillation of minute traces of tuberculin as due to a filtrable virus. The nasal mucosa is more apt to respond to foreign substances by allergic reactions than any other tissue of the body. The absence of a specific skin reaction to the nasopharyngeal filtrates would not influence the question. These views regarding the possible allergic nature of the coryzas following the nasal instillations of filtered nasopharyngeal secretions were expressed ten years ago by Victor C. Vaughan,³ though as far as I can determine none of the proponents of the filtrable virus theory has made any effort whatever to take them into consideration.

Experiments⁴ have been recently reported regarding the possible cultivation of this hypothetical virus. It is to be noted that the authors were properly conservative in their claims saying "we realize the difficulty of a final judgment concerning the successful cultivation of an invisible agent and simply present the facts as we have observed them." The experimental method was, of course, exactly the same as that discussed above, the only difference being that here the "virus" was obtained

from a test-tube instead of directly from the nasopharynx. The same objections regarding interpretation likewise apply.

In short, the filtrable virus theory of colds is not only unproved, but even if correct, it appears impossible to prove it with the means at present at our disposal.

THE HYPOTHESIS THAT COLDS ARE NOT DUE TO ORDINARY BACTERIA

Another series of experiments by Shibley,⁵ Hangar, and Dochez, is commonly cited as demonstrating that bacteria can no longer be considered of importance in the primary etiology of colds. In these experiments normal individuals were studied over a long period, and changes occurring in the respiratory flora during the development of colds were noted. The authors⁶ state that "from the results of this study we were led to conclude that none of the aerobic organisms is of primary etiologic significance because none appears for the first time in significantly increased numbers during the early days of a cold. Later they may be present as important secondary invaders." But lateness of appearance of an organism in artificial culture does not *ipso facto* displace the organism from the position of primary etiology. This point can be demonstrated by reference to two observations that have been made by me.

1. A⁷ culture of *B. Pfeifferi* was accidentally sprayed over the face of a laboratory worker. A severe upper respiratory infection followed, characterized by watery nasal secretion, bronchitis and conjunctivitis. Late cultures made from the exudates showed myr-

iads of organisms serologically identical with the organism inoculated. These positive late cultures contrasted strongly with the fact that an early culture made, however, at a time when symptoms were well established, was entirely negative for this organism. This observation is in many respects similar to a spontaneous cold recorded (Case 1, K. C. M.) by Shibley⁵ and his co-workers and on which their conclusion already referred to was partly based. K. C. M. showed no Pfeiffer's bacilli on nasal culture when symptoms first appeared. Later nasal culture showed a pure growth of this organism. Most probably K. C. M.'s cold was caused by *B. Pfeifferi*, exactly as there is no reason to doubt that this organism was responsible for the infection recorded by me.

2. A⁸ dilute culture of *Micrococcus catarrhalis* was purposely inoculated into the nose. A cold characterized by watery nasal secretion, sneezing, and later mucoid nasal secretion followed. Cultures of the mucoid nasal secretion showed many colonies of *M. catarrhalis*, although a previous culture of the early watery secretion had been entirely negative for this organism. I was the subject myself for these two observations. I make no claim of absolute freedom from disturbing psychic reactions. However, the inoculation of cultivatable bacteria and the later recovery of these bacteria by culture are concrete facts, for which there is no parallel in filtrable virus experiments.

It is not surprising that the thin watery secretion which often characterizes the early stages of a cold should contain few or no organisms. The situation is probably similar to that in

which only a few pollen granules are necessary to produce an attack of hay fever. No one, of course, would contend that the extrinsic factor in hay fever is not pollen merely because pollen cannot be demonstrated in the nasal discharge. Nor would anyone consider that hay fever was due to a virus if it should be demonstrated that the filtered nasopharyngeal secretion of one victim caused symptoms when instilled into the nasal cavity of another susceptible person. The mechanism of colds is possibly very similar to the mechanism of hay fever, with the exception that the causative agent in the case of colds is capable of multiplication, of actual invasion of the tissues, and of giving rise to a purulent exudate in some instances.

The experiments with chimpanzees, reported by Dochez¹ and his co-workers, also bear certain points of resemblance to the two observations made by me. These animals were inoculated with filtered nasopharyngeal secretions, and seven of sixteen animals so inoculated developed colds. This observation is cited by Dochez as further evidence supporting the filtrable virus hypothesis. But the animals developing colds showed a great increase in pneumococci or *B. Pfeifferi* on culture of the nose and throat as the colds progressed. I feel that it is much more logical to attribute the colds to these organisms rather than to postulate a virus in the filtrates. An adventitious origin of the colds cannot be excluded, particularly since these animals are very susceptible to such infections. Although eight control animals did not develop colds, it is to be noted that the work with the controls was done in June and July⁹

while the filtrates were inoculated in the test animals in winter. Obviously, the controls are not strictly parallel. Further, as in the case of the human experiments with filtrates, the possibility of an irritating or allergic reaction caused by the filtrates and paving the way for later bacterial invasion was not taken into consideration.

A great lacuna in this work with chimpanzees is that none of them has been inoculated with ordinary respiratory bacteria. My own experience with laboratory infections due to respiratory bacteria convinces me that the resulting cold may be too cruel and too severe for any widespread use of human beings for this purpose. It appears permissible, however, to inoculate humans with diphtheroids and *M. catarrhalis*, preferably such organisms as have not had many generations on artificial media.

The two observations mentioned above relating to the development of colds in humans following the intranasal inoculation by no means exhausts all instances of this kind. I have recorded a second infection due to *M. catarrhalis*, and still another¹⁰ resulting from *B. bronchisepticus*. I was also the subject of these experiments. But the literature is replete with other examples cited, among others, by Park and Cooper,¹¹ by Cecil and Steffen,¹² and by Fenyvessy and Kopp.¹³ In the presence of this mass of evidence it seems unjustified to conclude that we need no longer concern ourselves with the possibility that ordinary bacteria may be the primary etiological agents of colds.

SUMMARY

The reported experiments relating to the hypothesis that colds are due to a filtrable virus are inadequate to support the hypothesis. Such disturbing factors as difficulty in diagnosis, the influence of suggestion on the subjects, the irritative properties of the filtrates on the nasal mucosa, and the possible presence of allergic reactions to the filtrates have not been properly controlled. With the means at present at our disposal it is even doubtful whether the hypothesis can be submitted to proper experimental test.

The filtrable virus hypothesis rests on another hypothesis, namely, that ordinary respiratory bacteria are not concerned in the primary etiology of colds. This underlying hypothesis is likewise unproved. Two personal observations are cited which demonstrate that causative bacteria may be absent in early cultures made from the exudate in colds. These, and other instances from the literature, favor bacteria as being the extrinsic factor in the etiology of colds.

The early reaction in colds is probably very similar to the hay fever reaction to pollens. The difference consists in the fact that the etiological agent of colds (bacteria) possesses the power of multiplication and of tissue invasion. Later they may give rise to a purulent exudate. The etiological agent may be very numerous in culture only in this purulent exudate. The late appearance of bacteria in cultures does not prove that they are merely secondary invaders.

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A Layman Considers Migraine*

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ALAYMAN, who has been subject to migraine for forty-seven years; who is quite familiar with its voluminous literature, and who is fairly well versed in what little is known about the human metabolism, may possibly have made some observations worthy of notice by the medical fraternity.

ETIOLOGY

Migraine is not an ache, but an acute pain, typically localized above and posterior to the supra-orbital process; but it may rarely be parietal or occipital, and it may switch its site in different attacks or in the same attack. It is a distinct pathological entity, always inherited, though in transmission it is not always true to type, and the heredity may thus be obscured. It usually

begins in childhood or adolescence; seldom after 19. The precise nature and basic causation of the disorder are still shrouded in mystery. No explanation fits. Every theory is shattered by some specific incompatible clinical fact. Anything that lowers a patient's threshold of resistance may precipitate a seizure,—may pull the trigger, so to speak,—but what loads the gun is wholly unknown.

While the disorder is incurable, and is prone to increase in severity and frequency, it tends often to remit, in women more or less abruptly at the menopause, and in men to taper off with the gradual subsidence of gonadal activity; but many sufferers find relief in the grave alone. These spontaneous recoveries would seem to impose a complete negative on all attempted etiologies, including the latest candidacy, sensitization.

There does not appear to be much valid evidence going to show that migraine's relation to allergy is anything but fortuitous or coincidental. Out of 441 perennial hay-fever cases studied by Balyeat, 17 only, or 3.8 per cent, presented the migraine complication, although more than 50 per cent, all told, had some other indisputable allergic reaction, such as asthma, urticaria, or eczema. The fact is, in the early years of migraine, almost any

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NOTE BY EDITOR: The author of this paper is now 66 years of age. He believes that he inherited his tendency to migraine from his mother. It first appeared when he was in college at the age of 19. He has been an editor, but so severe and so frequent have been his attacks of migraine that he dare allow himself but two or three hours of close mental application a day. He has read extensively of migraine and has experimented with himself for nearly a half-century. The record of his observations and his conclusions cannot but be of interest and value to professional readers.

medical intervention, or improvement in regimen, or removal of some proximate cause, such as dietary indiscretion, eye-strain, constipation, or the like, may effect a "cure", which is not permanent.

Possibly the most plausible explanation of the migraine complex, as yet totally unsubstantiated, is to ascribe it to some specific metabolic or endocrine idiosyncrasy. It is apparently not easy to account otherwise for the spontaneous recoveries, which occur, if at all, almost invariably in the last decades of life. That failing gonadal function, or any concomitant of the same, can have any causal relation to anaphylaxis, is a tax on credulity. In common with all forms of life, mankind universally in senescence or sooner becomes sexually impotent. But migraine may persist till the end of life, even to the seventh or the eighth decade. It is in the later decades that resistance to anaphylactic shock should, *a priori*, be at its lowest ebb. In theory, therefore, if allergic in origin, migraine should never be "cured", in the latter end of life. In truth, however, recoveries almost never occur at any other time; while the true allergic disorders evince no disposition to cease at this period.

There would seem to be some color for the suspicion that the spontaneous recoveries are related to a diminishing or suspended supply of some unknown hormone or catalyst, that has, earlier in life, been thrown into the bloodstream in excess, or of faulty quality. This notion is not in conflict with the invariable tendency of all glands, unless it be the prostate, to subinvolute in later years, and with the fact that func-

tional and anatomical abnormalities are prone to be transmitted.

PRODROMES IN MIGRAINE

For a day or more before the attack, the patient is likely to be jerky and irritable; his muscles may twitch, especially those of his face and eyelids; and at night he may be awakened by the frequent involuntary contraction of legs and arms, as well as by the itching of his skin about the nose and mouth. Sleep has been broken and unrestful, partaking of the twilight variety, though on the night immediately preceding the attack, it may have been "druggy". While the seizure is brewing, there is apt to be a ravenous appetite, accompanied by a pronounced sensation of tension in the abdominal viscera, together with borborygmus. There has been, the day before the onset, an unusual subjective feeling of complacency and competence. If there was shock, mental or physical, it entailed an excitation, closely resembling that induced by an overdose of caffeine; the patient can not "let down", or stop the pounding of his heart, or make his mind behave; a torrent of thoughts and images pours through his brain for hours,—and the state is apparently objective wholly, due perhaps to some disturbance of the endocrine balance.

The actual onset may begin at any hour, but it most often occurs in the morning, after some stress or imprudence of the day previous. It is often ushered in by a slight dull ache through or above the eyes, at this stage indistinguishable from the mild negligible aches caused by or accompanying constipation, eyestrain, fatigue, hyper-

chlorhydria, scant ingestion of fluids, and the like.

While the day before, the patient felt equal to almost anything, this morning he is lethargic, inert, and equal to almost nothing. He lacks appetite, and his food does not taste right; his vision is changed, and his lenses, if he wears any, do not fit, owing to distortion of the eyeball. Feet and hands are cold and clammy.

The prodromal stage may not be very noticeable, and may last for days before the actual onset, and may even be aborted by purgation, especially early in life, or an attack may be precipitated by some trifle. Or the symptoms may subside without medication. Beginners, whose seizures occur infrequently, can almost always stave off any individual attack by prompt and vigorous catharsis, by a saline or aloin, if exhibited on the first appearance of the characteristic prodromes, which every patient soon learns to distinguish almost unerringly.

SYMPTOMATOLOGY

At the outset, migraine may occur not oftener than once or twice a year, or even less frequently; later as often as twice a week. In truth, in severe types, reckless indiscretions are fully capable of inducing repeated seizures, one after another, so close together as to be practically continuous. Early in life the attack may be slept off, or may end with emesis; later, the duration may be so long as a week or more. When the habit has been fully established, two or three days, in the absence of medical intervention, are about the average. The characteristic pain may be a by-product, for the custom-

ary concomitant metabolic disturbance may endure for days after the pain has ceased.

Scotoma may usher in an attack, but either may be present without the other. Periodicity, except in women at the menses, is not marked. Long-standing cases take no account of periods. Pain and the metabolic explosion may be so severe and prolonged as to induce symptoms of traumatism. Toxemia may be so profound as to resemble uremia in all respects except casts and albumin. Exceptionally heavy visitations may be accompanied by arthritic symptoms in maxillary and neck muscles, on the same side as that on which the pain is localized, and this pseudo-arthritis may last for weeks.

There is often a drop in bodily temperature, even to 95° or less, and a rise in systolic pressure, but neither manifestation is invariable, during attacks. There is nearly always more or less pneumogastric disturbance, as evidenced by dyspnea, arrhythmia, excess secretion of saliva and of nasal mucus. As in gout, there is apt to be polyuria before seizures, but during the attack, the urine, as in gout, is pretty sure to be scanty and heavily charged with solids. Peristalsis is usually diminished before and during the attack, but migraine may occur during diarrhea or catharsis.

The tongue is usually, but may not be, furred; a blackish tinge is an index of the severity of the visitation. During seizure, the temporal arteries may be much distended, while the distal arterioles are constricted, but marked vascular change may be absent. It is possible that the pain may be caused by a vasomotor disturbance in the cerebral

cortex, there is established that enormous mental

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cortex, as has been postulated, but there is no clinical evidence going to establish the validity of this theory and that edema could occur hundreds or thousands of times in the same area, with no resultant structural change, or mental impairment, is hard to believe.

Before the actual onset, there may be marked mental depression; and during, before and after, considerable hebetude. The patient does not lose his zeal, but regardless of pain and malaise, he is able to do very little. His mind refuses to do his bidding; he feels as if drugged; he can not recall names, or remember what he reads or hears; he misuses words; has difficulty even with his wonted daily routine; can not trust himself to compose a business letter; all his sense-perceptions are more or less obfuscated, especially sight, hearing, and taste.

While nausea is common, emesis is often impossible, so that undigested food may remain in the stomach during most or all of the attack. There is probably always hyperchlorhydria, caused perhaps by hepatic congestion, and the excess of acid may abrade the stomach mucosa, so that eructations are streaked with blood. Even if or when emesis is induced, the stomach may continue to "buck" for hours after it is emptied; even water may not be retained. Heart action is usually slowed down, even to 50 per minute; and the radial arteries are usually threadlike. Tenderness of scalp, at the seat of pain, is common, and there may be desquamation at the same site.

Early in life, any individual attack is likely to end abruptly, after vomiting, or purgation; later, remissions are usually gradual, extending over hours

or even a day or more. As a rule, sleep is difficult to compass, during attacks, regardless of pain. Loss of sleep, together with exhaustion from pain, may induce between attacks and during them an added constant headache of neurasthenia. Thus the patient, unless or until he capitulates in some degree, may be reduced to helplessness.

The onset of migraine is usually not sharply defined; most often it travels with a leaden heel. The pain is apt to begin diffusely through the eyeballs, or frontally, over the brows; but it soon localizes, and is justified of its name, hemicrania. With actual advent, the patient's feeling of tension may abate; but this may be partly auto-suggestion, for this pathology inculcates resignation, at least after thirty or forty years of suffering. In that migraine is essentially a toxemia, it is rather odd that it does not seem to shorten life or impair mentality. On the contrary, its victims are not below the average in acumen or longevity. Trudeau told this writer that possession of this complex seemed to inure to the advantage of those with pulmonary tuberculosis. And it is a fact, that any intercurrent infection with pyrexia will result in complete freedom from migraine for weeks or months. But any vicissitude, as prolonged convalescence from severe illness, or traumatism, may be followed by marked and lasting exacerbation of the migraine.

PROPHYLAXIS IN MIGRAINE

In that migraine is incurable, intervention would seem especially indicated along the lines of prophylaxis. Anatomical abnormalities impairing function should be removed; defective vision

aided with proper lenses; practices that lower body tone discarded. But after all has been done, the patient still has his migraine. At most, the sphere of his activity may have been widened somewhat for a time. But, as he is usually ambitious and unable to achieve a vegetable existence, he is apt to transcend his limitations as much as before, so that the net result, so far as the migraine is concerned, is pretty sure to be nearly nil.

It is not possible to devise a regimen for every individual case. Prophylactic expedients are many and varied, and should include: A maximum allowance of sleep; a minimum of stress, mental or physical; a diet carefully regulated, both as to quantity, quality, and components; an active elimination.

Migraine being a toxemia, its victims have much to oxidize. By reason of over-acting adrenals, hepatic and thyroid efficiency is constantly impaired, and peristalsis slowed down, while pancreatic activity is diminished. That is, metabolic instability is accentuated at the very time that elimination is subnormal. Apparently the chief function of sleep is to enable the body to clean house. Hence these patients need all the sleep they can get. Even twelve hours per diem, including an afternoon nap, is none too much in long-standing cases, if patients can get it. Few can attain this maximum, as the toxins in their bloodstream irritate the higher nerve centers and make them sensitive to objective impressions during sleep. Quiet sleeping places are not easy to come at now.

Emotion is the great proximate precipitant, and the migrainous appear all to be of unstable equilibrium. Even the

ordinary wear and tear of daily routine are trying to the typical patient, and to shield himself is all but impossible. For, after his family circle or business associates have witnessed scores or hundreds of seizures, they inevitably become callous, and his sufferings come to be regarded as partaking of the nature of hypochondria, or malingering. And this reaction acts as a spur to the patient himself, to his own undoing.

An outdoor, carefree life is the ideal, but few can arrange it. Excitement, especially sex; cards; social whirl; movies; overwork; tension; worry,—all have their price. A business or professional man may be compelled to retire, but a mother can scarcely abdicate, and for her, romping children, or a wayward adolescent, or a cocky servant, or cheating tradesmen may be as inimical as almost any factor imaginable.

Most people eat too much. Excess is normally burned up by the liver and thyroids. But the oxidizing capacity of the migrainous is already overtaxed. Hence, their intake should by experiment, be reduced to a minimum, which for those not engaged in manual labor, should probably not exceed 2,000 calories per diem. Animal proteids should be used sparingly, for when improperly converted into amino-acids by trypsin, they are decidedly toxic, and in the migrainous, pancreatic function is seldom perfect. And on this account, meat is best handled when comminuted, as in Hamburg steak.

The purin-producers, such as coffee, alcohol, tea, chocolate, should be abjured, for purins are hard to eliminate, and appear also to be specifically irri-

tating to the nerve centers. The customary heavy meat meal at night should be abandoned, because it is then that the metabolism is at lowest ebb.

A neutral blood plasma promotes elimination, and it is a biological commonplace that cell activity goes on best in a neutral medium. Neutrality is promoted by the liberal ingestion, daily, of vegetable juices, most easily achieved by boiling the vegetables and drinking the pot-liquor. Stewed fruits, if subacid, are also excellent. Citric and malic acids are justly under suspicion. Nearly all these patients suffer more or less from spastic constipation, and cellulose in large quantity tends to plug up the alimentary canal; hence the suggestion that needful vegetable juices be obtained by boiling, rather than by direct consumption of the fiber. Cellulose, also, is broken down by bacterial action in the colon, a process productive of gas, irritating to both sympathetic and vagus, which are undoubtedly concerned actively in the migraine complex.

Unless contra-indicated by vascular or cardiac or renal pathology, every patient should drink at least two quarts of liquid per day; it is expedient to complete this by 4 p. m., as a full bladder interferes with sleep. Many or most subjects do not tolerate casein; milk, therefore, is not for such. Any excess of sugar is stored in the liver in the form of glycogen, and this storage and oxidation are incompatibles; hence the wisdom of using sugar very sparingly. Fats are also not well borne. Ben Jonson, in "Volpone", written in 1605, remarked the fact that the Dutch, much addicted to balls of butter, had to purge after such indulgence. The

relative inability of the migrainous to handle fats well seems to be specific. Gas-formers, such as the legumes, cabbage, oatmeal, spices and condiments, should be left severely alone. Food purveyors are now pretty sophisticated. Artificial preservatives, such as sulphur dioxide, and coal-tar flavoring extracts and colorings, are in extremely common use, and as a whole they are excessively deleterious to the migraine subject. Unless or until all such are eliminated from his dietary, little or nothing can be accomplished for his relief. To fend against them is almost impossible. The preservatives are common in cured meats and fish as well as fresh, evaporated fruits, molasses and syrups, milk and cream, etc.; and the coal-tar derivatives are in high favor with bakers and candy-makers.

Empirically, a varied diet is best. Apparently in all these patients, pancreatic enzymes are sometimes if not always lacking in quantity or quality; and trypsin can not break down starch; nor can lipase, proteids; nor diastase, fats. Starchy foods must of necessity be the mainstay; and bread and butter with fruit or vegetable juices furnish very nearly a balanced ration. Bread is the sole food that a civilized palate can endure at every meal, and it alone has been subjected to a temperature so high as 500° for so long a period as one hour, thus insuring the breaking down of the starch granules. Personal idiosyncrasies in diet are mostly imaginary, though allergy is an undoubted fact. Every patient should, by careful experiment, work out a menu for himself and adhere to it so far as possible. But not every layman is competent to do this, and even dieticians are apt to

conclude, if shellfish or strawberries provoke in their own persons urticaria or the like, that such foods are unfit for human consumption. And migraine patients are especially given to ascribing, wrongfully, a given visitation to some viand previously ingested. Any food, taken in moderation, has in all likelihood, an extremely faint causal relation to any individual attack of migraine, albeit a pronounced allergic reaction might conceivably, like any other factor contributing to the lowering of the threshold of resistance, become the proximate precipitating cause of trouble. Generally speaking, gastronomic joys should be mostly taboo to severe types of migraine. In fact, the average subject would reduce his sufferings almost to the vanishing point, if only he could subsist without eating at all.

MEDICATION IN MIGRAINE

In the way of medication, the two sheet-anchors are cannabis indica (Herring's) and calomel. Cannabis is fool-proof, to all but the fools to whom bread-pills are habit-forming. It alleviates the pain during seizures, and by obtunding the sense perceptions slightly, it interposes a barrier or curtain between the patient and the slings and arrows of outrageous fortune, which imperviousness increases with use. And it does not check the secretions to any appreciable degree. Some patients are entirely relieved by cannabis as long as it is exhibited. Initial dosage should not exceed 1/12 grain, repeated three or four times each day. The maximum objective is 1/4 grain every four hours while awake. During stress, this maximum may be usefully

exceeded. Every migraine subject, unless abnormally susceptible to auto-suggestion, should be put through a course of this drug; it is the nearest approach to a specific.

To abort or break up any given seizure, nothing takes the place of calomel. Its handling is an art, which each patient must to some extent acquire for himself. For no two patients are precisely alike, nor are any two visitations identical in the same individual. Calomel is not altogether foolproof. It usually gives such relief, that there is a temptation to abuse it; it is hardly adapted to daily use, if for no other reason than that it must be excreted through the kidneys.

Upon the first prodromal symptom, which the patient can almost unerringly detect, he should take probably not less than 1 1/2 grains, though some patients may require more, to abort the impending attack. If this does not result, after 12 to 18 hours in relief, the initial dose should be repeated. If the pain persists, after another 12 hours or so, the sufferer should take his full maximum, which may be anything up to six grains or so. There is no sense in allowing the agony to continue for days. The total amount required bears very close relation to the degree to which the patient has flouted his limitations, previous to the onset.

Calomel in small doses is decidedly not indicated; for the disorder and concomitant metabolic explosion travel so rapidly that repeated tenth-grains can not overtake the procession of events. And after the complex has been permitted to attain its climax, it may be days before the pain can be stopped, and much longer before the

metabolic equilibrium can be restored. Epsom salts, on an empty stomach, in plenty of water, should usually follow, after the pain has ended, albeit the salts may not be necessary, if the patient is taking a daily laxative. For those patients who can not tolerate calomel, podophyllin, in 1/4 or 1/2 grain doses, taken in plenty of water, may answer as an imperfect makeshift.

Every patient should induce, at least experimentally, not less than two loose evacuations daily. Catharsis, by inaugurating profuse watery discharge from the rectum and sigmoid, undoubtedly carries off much toxic material and thus lightens the liver's load. Aloin is the ideal laxative, and it alone may hold the lid on migraine for years; it can be exhibited for a lifetime with little or no ill effects discernible. Anyhow, it is a condition, not a theory, that confronts these patients. Addiction to laxatives may have drawbacks, but as a choice of evils, migraine is the greater. Salines and enemata are not for prolonged use.

After a siege, migraine patients

might well avoid violent exertion. Pain weakens the heart-muscle, and if it is repeatedly overtaxed, the weakness may become permanent. Imperfectly acting hearts are not uncommon in these subjects, and such may accentuate the complex. Those who have chest-pains, extra systoles, arrhythmia, or chronic digestive disturbances might profit by a course of digitalis.

The migraine subject of pronounced type is among the most miserable beings on earth; for the sum total of his sufferings, mental as well as physical, probably surpasses that which ordinarily falls to the lot of several hundred normal persons throughout their mundane existence. Genius has been defined as the capacity for infinite pain-taking. Without this faculty, to combat a lifelong migraine, is a task to tax the patience of a saint, and the courage of a paladin. Mankind, however, as Osler justly remarked, has never emerged from the thaumaturgic age; and most migraine victims want to be cured by taking a pill.

Presidential Address American College of Physicians*

By S. MARX WHITE, B.S., M.D., F.A.C.P., *Minneapolis, Minnesota*

SELECTION by you as president for a year has allowed me to follow in the footsteps of men notable in medicine in this country. For the opportunity I am grateful. The honor brings with it great responsibilities.

This is the second meeting for which the president has been given the responsibility for the program of the General Sessions. This change was made two years ago in the belief that the president, using the prestige of his office, would have a more ready response from invited guests, domestic or foreign, and would have the opportunity to use speakers of his own choice rather than to select material voluntarily offered. The excellent program for the General Sessions presented by President Miller at Baltimore a year ago proved the wisdom of the change. This year, in spite of unusual difficulties, a program representative of the progressive spirit and of the latest advances in medicine is presented.

During the year which has elapsed since the Baltimore Session, the College has lost by death one Master,

twenty-five Fellows and six Associates. It is customary to publish in the *ANNALS OF INTERNAL MEDICINE* a biographic sketch of each, but some losses, because of their significance to the College, deserve special mention.

Dr. Reynold Webb Wilcox of Princeton, New Jersey, died June 6, 1931, at the age of seventy-five years. He was a long time Professor of Medicine at the New York Post Graduate Medical School and Hospital, the author of many articles in American medical journals and of a well-known work on *Materia Medica and Therapeutics* which ran into ten editions. He was largely instrumental in the organization of the College, was a charter member and after the College had secured its charter on May 11, 1915, under the laws of the State of Delaware, he became the first president, continuing in that office until 1922, relinquishing it then to Dr. James M. Anders of Philadelphia, but maintaining an active personal interest in the College.

Dr. George Martin Kober, born in Hesse Darmstadt, Germany, lived to the ripe age of eighty-one years and served his adopted country with distinction. In the last decade of the nineteenth century he directed attention to the pollution of the Potomac

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River water as a factor in the spread of typhoid fever in the National Capitol, his home city; and was the first to point out also the part played by flies as carriers of the disease. His activities helped greatly to secure the legislation and appropriations by Congress necessary for proper sanitation in Washington. He remained active and interested in medical affairs until the very end of his career and the charm of his personality contributed much to the interest of medical meetings in which he was an attendant or participant in discussion.

The career of Dr. Francis Xavier Dercum, world famous neurologist, closed suddenly and unexpectedly at the age of seventy-four years as he, then president of the American Philosophical Society, sat in the chair formerly occupied by Benjamin Franklin, and was about to open the 204th annual meeting. "He died", remarked a fellow scientist, "as a scientist would wish".

Dr. Leonard M. Murray of Toronto was elected to the Board of Regents of the College in 1923 and served the two terms of three years each allowed by the by-laws. His contributions to our knowledge of cardiovascular disease are well known. He was only fifty-six when he passed away suddenly and unexpectedly in the midst of his career and left the memory of a charming personality and warm friendliness with those who were privileged to come in contact with him.

The death of Dr. Aldred Scott Warthin, a Master of the College, at the age of sixty-four closed a remarkable and brilliant career while still in full tide. No single individual has

made so great a contribution to the welfare and development of the College and the ANNALS OF INTERNAL MEDICINE as he. Appointed editor in 1924 he brought the ANNALS to a most authoritative position in the medical literature of this country. The first four years spent by him in teaching at the University of Michigan, from 1891 to 1895, were in internal medicine under Dr. George Dock. This colored his thought in later years, for no pathologist of his time thought with and for clinical medicine more assiduously or effectively than he. This attitude rendered him particularly useful and acceptable as editor of the ANNALS. He understood and labored for the interests of clinical medicine. During the last year of his life he occupied himself particularly in the aims of the College. He felt that the College was just entering its greatest period of usefulness. Shortly after the Baltimore Session, and a few hours before his death, which came unexpectedly, he dictated a long letter to me, charged as I was with the responsibility for the program of this present session. In this letter he said, in part: "I think that I would like to be on the program next year at the California meeting. So many men have written to me concerning various matters pertaining to the College that I would like to make an address bearing upon the future of the College and its functions. . . . The editorial which I had in the number preceding the meeting of the College apparently excited a good deal of thought and I am glad to see that there is a growing appreciation that the College should sometime have something more than mere scientific work. . . .

I think that there is a real opportunity to make the College a more vital force and influence in American Medicine than it is at the present time." The letter is unsigned but was forwarded to me immediately after his demise and breathed the spirit of the man. What the concrete suggestions were we know only in part. He had never formulated them completely to anyone, so far as is known. Their spirit, however, was one of a positive attack on the problems—cultural, professional and economic—facing at least that portion of the medical profession represented by the College. They were the outgrowth of a rich experience and a trained and cultured mind. No quotation from this editorial, detaching a part from the whole, would adequately represent his thought. Rather would I refer you to its entirety in the *ANNALS* for February, 1931.

It is a source of personal gratification to be able to pay tribute to the man who has carried these many months the work so abruptly relinquished by Dr. Warthin. At a sacrifice of time needed for other interests, Dr. Carl V. Weller, Professor of Pathology at the University of Michigan, has edited the *ANNALS OF INTERNAL MEDICINE* in a manner beyond criticism. The editorial writing has been carried on with eminent satisfaction to all, welcome changes and improvements have been made and the rapid growth in size, character and influence, well under way during Dr. Warthin's lifetime, has continued without interruption. To him we express our profound gratitude for this loyal and effective service.

The growth of the College contin-

ues without interruption. The mechanism by which a period as an associate is a prerequisite for fellowship, became operative with the close of the year 1931. Time alone will demonstrate whether this change will accomplish its purpose. While the College has not as yet become unwieldy because of size, it was apparent that such a time was approaching and that it was desirable to prevent, in a healthy and logical manner, too rapid expansion. The period of time required as an associate will give the College an opportunity to appraise the spirit and accomplishments of each candidate for fellowship, and will give the candidate an opportunity to learn more fully the purposes and service fundamental to the success of the College. The new plan makes it mandatory that each candidate for associateship be scanned with as great care as that formerly used in selecting nominees for fellowship.

I call the attention of the Fellows of the College again to the opportunity presented in life membership. While economic conditions during the past two years and more have slowed accession in this department, those in position to do so have an opportunity even greater than before. Moneys derived from life memberships are set aside in a separate endowment fund, through which the scientific aims of the College will be advanced. The College will attain that influence and power at which we aim only when its resources are adequate to accomplish its purposes. The endowment fund may receive accessions in many ways. Life membership should be purchased not by the few, but by the many. Let us be reminded that the initiation fee is a credit already

paid toward the cost of life membership. The number, instead of about thirty, should be three hundred and more. Donations, small when necessary but generous if possible, should be a habit and not a rarity. Arrangements for bequests at the death of members or of others interested in medicine should be discussed and encouraged by us. To those of us unable to purchase life membership, I would suggest a bequest of an equal sum *In Memoriam*. Philanthropically minded friends and clients should be told of the opportunity for continued usefulness of their moneys under skillful direction by the Board of Regents which is a continuing body of men wise in the use of funds for the advancement of medicine. Such funds as donations or bequests to the College are free from gift or inheritance taxes, an inducement to many at a time when taxes of all kinds are becoming a burden. Such matters as these should become subjects of free conversation with us, for the philanthropist often keeps his purposes in hiding and his gifts may be revealed only by his testament. We have made a beginning, \$52,400 since 1926. This should give us courage, but it is too slow. We would each like to see the fund in effective operation during our lifetime. With enthusiasm and interest on the part of our entire membership, or of only a significant portion of it, I am confident that many sources not yet uncovered could be found for the endowment fund. Additions of any kind, many and small, fewer and large, would swell it to a place of real power and usefulness.

As a new departure, an example of activity outside of the primarily ex-

pressed purposes of the College, we have had this evening the presentation of the John Phillips Memorial Prize given annually by the College in memory of that beloved physician, who gave his life in so tragic a manner that others might be saved. A member of the Board of Regents from 1923 until the time of his death in 1929, he served the cause of Medicine and the College with distinction. It is fitting that his life and work should be brought again to mind through the presentation of the prize and by an address by Dr. Oswald T. Avery, the distinguished first recipient thereof.

Our progress depends upon the devotion, the intelligence and the continued application of the coterie of men devoting their lives to the advancement of knowledge. The direct financial rewards for research in medicine and in other branches of science are pitifully meager and the workers are often seriously handicapped by lack of the support needed in their pursuits. To this group of men every honor is due and by them every financial aid is used to further their research. The very fact of devotion to their calling is an evidence of their earnestness of purpose. Every aid rendered them brings its return many fold. The College is in the forefront in its encouragement of scientific work. Money is needed in order to further this and similar enterprises. The endowment fund, aided by life memberships, will exercise a most potent influence in this direction.

The past year has seen cancellation of many medical meetings and Congresses planned in Europe. There the change in economic status has reached into every phase of life and this

restricted activity has thus affected the time given to consideration of the most fundamental human needs, of health and physical welfare. To the west of us Japan and China, profiting nothing by the horrid experiences of newer civilizations, have been employing the age-old methods of Martian struggle, and medicine there is compelled to occupy itself with binding up wounds, removing the sick and injured from the lines of communication and, in so far as possible, restoring them to their destructive occupations. In the meantime, progress in constructive medical thought and effort is halted. In this continent we are blessed with a common language and understanding. The long boundary between Canada and the United States needs no military fortification or patrol. We have a common inheritance and understanding and for long have been able to adjust any differences of opinion by peaceful means. We can thus continue our constructive efforts. With our neighbors on the south, although handicapped by differences in language, we are at peace and will so remain. Our common interests have taught us to avoid destructive means of settling questions between nations. Our situation, therefore, calls for increased effort in the arts of peace.

When discussing the functions of the College we should be reminded of our duties and privileges in the American Medical Association, since all forms of activity of those licensed to practice medicine are there represented. To it we individually and collectively give our allegiance and support. Its great medical *Journal* and *Hygeia* lead in their respective fields of general

medicine and surgery and of popular hygiene. Two of the major activities of this association are of such significance to medicine that they deserve particular mention, not only for themselves but as examples of what collective efforts in a great association may accomplish. The first of these is that of the Council on Pharmacy and Chemistry. This Council has done, and is doing, a service of incalculable value to the medical profession in freeing us from the need of reliance on secret and proprietary preparations and has given us standards by which all remedies may be judged. Not only as individuals but as an organization there should be specific and expressed approval of the work of this Council and an active adherence to the principles it has laid down. Only by strict compliance with its requirements can we hope to keep therapeutics on the high plane it should occupy, free from all secret remedies and with positive knowledge, openly arrived at, of the character of all therapeutic procedures.

The second major activity in the American Medical Association to which our support is due is that of the Council on Medical Education and Hospitals. The association, together with the forces and organizations whose support it has enlisted, has been a major factor in placing medical education on the high plane it now occupies in most states. The elimination, now almost complete, of the low standard commercial medical schools and the establishment of standards more nearly uniform throughout the country has been a service of prime importance. In the matter of hospitals the activities of the Association has been limited largely

to the educational aspect, the training of internes, and the opportunities for special training for residents. The important function of standardization of hospitals was assumed by the American College of Surgeons while the Association slept, and before our own organization, to represent medicine as that college represents surgery, was developed. All credit is due that college for its enterprise and for the energy with which its standardization project is carried out, but the anomaly of surgeons posing the standards for the physician is apparent to anyone who has the welfare of the whole profession, and of the patient as well, in mind. It is probable that only the assumption of greater responsibility by the American Medical Association will help to correct this unbalanced state of affairs. Renewed attempt to further the interests of medical service in standardized hospitals may yet avail. In spite of this disadvantaged position of internal medicine at the present time, the public is acquiring a growing appreciation of the part to be played by hospitals in diagnostic and medical forms of service. While it is, undoubtedly, true that in many hospitals surgical service is the chief aim, it is equally true that the growing complexity of equipment necessary for adequate medical service is forcing the patient with non-surgical disorders into the hospital where the proper equipment can be provided and more effective study made.

Is it possible that there is a distinction between the medical and surgical interests of a patient? I cannot agree that there is. The interest of the patient demands, except in emergencies and with the diagnosis readily made, a

thorough survey to discover first of all the character and the sum of conditions and disorders present and, secondly, not primarily, the therapeutic procedures to be applied. The degree of skill and experience necessary for the solution of a diagnostic problem is just as great as for the performance of an operation. There has been a tendency to foster the idea that long training and special experience are necessary to make a surgeon, but that anybody can make a diagnosis, or can carry out medical lines of therapy with tolerable accuracy. In fact, during the last two years, particularly, it has been a source of some amusement, if not pain, to see some of our erstwhile surgical confreres indulging in the mysteries of digitalis, the diuretics and some of the rest of our wellworn armamentarium in the intervals between their now all too infrequent operations. At some time in the near future it may be necessary for some organization, either this or the American Medical Association, to insist upon an adequate recognition of medical, as well as of surgical, values in hospital service. It is to be hoped that the invitation to that end may be given by the organization which has so far kept that function to itself. By this means a service of greater value, both to the medical and surgical interests of the patient, could be performed.

The primary purposes of the College are well set forth in our constitution. There has been much discussion as to additional activities a body such as this might well undertake. To the present it has been thought advisable to concentrate on making the foundation sound and sure, and on assuring a

membership representative and inclusive of the men in the United States and Canada best fitted by character and training to understand the problems of our special fields. Standards of character and attainment have been set but there has been no thought of limitation in numbers. As a result of this policy the College has attained in the sixteen years of its existence a position of influence in internal medicine. The annual session has been the outstanding and most valuable meeting of the year. The clinics and demonstrations at the place of meeting by the men of the schools and hospitals have given those attending the session an insight into the character and breadth of the medical work in each of the great cities visited, thus giving an opportunity to each Fellow to compare the work in his own locality with that in widely scattered medical centers throughout the country. This in itself is one of the most valuable features of our sessions.

At this point I should like to call your attention to the extraordinary depth and breadth of the clinical program arranged here in San Francisco, and to thank, for the College, Dr. Wm. J. Kerr, who has filled with distinction the position of General Chairman.

With the cultural background of the Fellows of the College it is natural that the history of medicine should receive considerable attention and should have at least some place in our program. In this, and the two sessions preceding, we have given it more attention than in previous years and have sensed a favorable response on the part of the membership. This year we find this stimulating and wholly enjoyable ac-

tivity of many of our Fellows exemplified not only in the general sessions, but also in the series of exhibits and papers on medical history in the clinical sessions. Historical considerations, however, can claim only a minor portion of our time and other organizations among medical men are giving it more serious attention. To them we extend every aid and encouragement.

We glory in our past, not only remote, but so immediate that it may be called the present. The achievements of medical science need no catalogue here. The conquests of infectious and other forms of preventable disease, the consequent prolongation of life, the prompt application of all forms of scientific discovery to our problems as we have cast off the cloak of mystery once worn, have all placed medicine in the forefront of this progressive age. Our scientific problems loom large, but are being attacked by the best minds on every hand. The serious difficulties confronting us as a profession today lie as much in the social as in the scientific field.

Broad and vexing questions in what may be called the field of medical economics are constantly arising. Their solution needs wise and unselfish leadership. The medical profession is taking what is believed to be its proper part in the five year study of the Committee on the Costs of Medical Care. Some results of these studies have appeared from time to time and the five years allotted will have elapsed at a relatively early date. Some definite recommendations will be made. It is hoped that some new applications of our age-old principles will be suggested and that some new, or so far relatively

untried, methods of organization will receive attention and may be recommended, at least for trial. That the committee can solve, even within a five year period, all of even the major questions posed is not within the bounds of human possibility.

The existence of the committee has made the public more acutely aware of our economic shortcomings than of our virtues, and whether we wish it or no, forces not of our own choosing will attempt to invade what we believe to be properly our domain. The paramount interest is that of the public. Public interests are often expressed in the form of legislation, but legislative bodies are notoriously lacking in an appreciation of medical values and it is only when guided, or driven, by an aroused medical opinion that legislation actually in the public interest has been secured. One doubts legislative wisdom in the medical field, or for that matter in any other field where science is involved. One needs only to cite the legislation involving cults in most of our states for illustration.

Dr. Ray Lyman Wilbur, writing as Chairman of the Committee on the Costs of Medical Care, states pointedly that the achievements of medical science must be made available to all, that the only way this can be done is through organization, that the organization of medical facilities will be painful to some even if necessary, and that we must make many shifts and changes in our thinking if adequate medical services are to be made available at reasonable cost to the citizens of this country. Two questions arise. What shall be the forms of those organizations? Shall they be determined by states or

communities, or shall they be by medical men themselves?

The various ways in which organization may affect medical service as it relates to disease and disability, i. e., to the practice of medicine, may be thought of as in four great groups:

1. The state and other political units which already provide for certain medical needs of the public. Among these is custodial care of the insane and the incompetent. There is provision for isolation of those whose infectious disease would otherwise be spread throughout the community. There is the study and control of public health relations, and there is, finally, medical service in all its forms for the indigent. In all these ways the state, through organization, can provide service better than the individual. Many people affected by these services could pay for them if necessary, but with the public needs paramount it is clear that the state can perform the service with the welfare of the state in mind. It is only when the state proposes to serve in other ways the individual who is able and desires to pay for individual medical service that we take notice. In the medical mind, the extension of state medicine beyond the needs of police power, public health and public service is inadvisable, largely because of the knowledge that it will do away with the valuable personal relation between physician and patient, necessary if the interests of the patient are to remain primary.

2. Lay organizations, lodges, benefit associations and the like have grown in this country, and in many instances continue to grow in spite of the opposition of the medical profession in the

locality. In a few instances only have they succeeded in maintaining the high level of professional attainment we seek to guard. In these organizations the continued employment of medical men is subject to many considerations other than their ability to deliver an adequate service. Insurance companies, either in relation to such activities as life, health and accident insurance, or as a new project of hospital or sickness insurance, or a combination of both, are becoming interested. Probably because there is no firm actuarial basis for premiums, and because the past experience in disability benefit is unfavorable, the old line life insurance companies seem to be reluctant to enter this field. The work of the accident insurance companies is principally in the protection of their policy holders and we may expect no constructive efforts from that source. In all these fields the primary control is lay, rather than medical. The medical man is the employee and not the principal. In all these organizations, the cost is met by prepayment of a fixed charge, which, though it may be varied somewhat from time to time as the result of experience, is nevertheless relatively stabilized.

3. Hospitals are more and more providing centers about which medical men may group themselves. The interrelations of the members of the staff are often only those of proximity, but more and more close ties of interest are being formed with the hospital as a center. It seems quite probable that valuable development along these lines can be fostered and that common interests, with more or less definite co-ordination, can be built in and around

these institutions. In teaching hospitals a staff of salaried whole-time men, teaching and practicing the various specialties and covering the entire field, is practicing group medicine. When in a state owned public hospital with such a staff the number of individuals treated is not limited by the needs of material for teaching, then the institution is furnishing a form of state medicine. An interesting form of group medicine often closely related to teaching hospitals is seen in the Student Health services in many of our large colleges and universities.

4. Physicians are organizing in many and various ways to manage their own affairs as they relate to the practice of their profession. In some instances such organization involves only a combination of facilities in hospitals, or in more or less loose aggregation, for the purpose of securing laboratory and technical service. The formation of more closely knit groups in private clinics has been a development in recent years. In such groups, either related to or separate from hospitals, the personal relation between physician and patient will be maintained. These groups are formed primarily for the purpose of providing every needed facility for fact finding and for closer integration of the work of one specialty with another. In a properly constituted group each man may be said to have a dual function: The first is as a specialist in his chosen field; the second is as a general practitioner guiding and conserving the interests of his particular patients. Specialism in a group becomes less hard and fast than when a man is practicing alone and the specialist in a well constituted group be-

comes more of a general practitioner than he ever would practicing his specialty alone. Group medicine will be in favor with the physician only when he realizes that he can be a part of it, and that his facilities can be thus enormously increased in a manner using each to its capacity. Without some such mechanism the physician cannot own and control his laboratories and his apparatus without an undue and often depressing financial burden. The group in its ideal form represents an expansion of the partnership principle, and allows a community of interest among medical men obtained in no other way.

In a recent discussion of some economic considerations influencing the future of the practice of medicine, at the Annual Congress on Medical Education, Medical Licensure and Hospitals held in Chicago in February, Hugh Cabot, in addition to considering the various groupings possible in medicine much as in the forms outlined above, made the suggestion that "big business" could make a valuable contribution to the forms of medical service. We will grant at once that the dollars made in big business can be put to work for human welfare in forms of medical service. This has been abundantly demonstrated through the many bequests already made, and through the great foundations now in operation. That the methods of accumulating those dollars could well be used in medicine seems impossible. The ideals and practices of big business and of medicine are in many ways diametrically opposed. If by big business there is any implication that a corporation could practice medicine as a corporation, it is to be hoped that question

is already settled in the negative. Business advertises itself by headlines with an eye to selling the product. Medicine *desires* to advertise itself only by the character of its service and results. When medicine advertises for sale that which the great bulk of the public wants, which is a cure and a cure only, it is open to a conviction of misrepresentation. The cure cannot be guaranteed. In the mind of the public, as well as in the mind of the medical profession, big business does not represent the ideals for which medicine should stand. The dominating influence should be that of service and not that of the financial return.

Speaking broadly, the economic principles underlying the provision of medical service will be determined either by the medical profession or by politicians. In the past we have been most influential in determining our qualifications and in setting high standards for ourselves, but having accomplished this, pressure from without—political pressure if you will—has left us woefully surrounded with a fringe of inadequately prepared cultists, whose chief claim to following lies in hasty and correspondingly faulty methods of approach to the problems of the sick and disabled. The cults and quacks rely upon salesmanship rather than service to secure their following. We have been content to rely upon service and are probably, as a whole, the worst salesmen in the world. I would not put salesmanship above service. To do so would be to lower ourselves to the level we decry. It is true, however, that too large a portion of the public fails entirely to understand our attitude and is too little aware of the solid foundation

on which the science of medicine rests. We are forced to recognize the fact that we have not adequately presented our point of view, or the real significance of our service to the public as a whole. This presentation cannot be made and controlled by individuals, for when so done personal interests creep in and the interests of the profession, as of the public, are likely to become secondary. The task of an adequate presentation can be performed only by and through the organized bodies representing medical opinion freed from individual concerns.

In England and Germany the imposition by legal enactment of certain intolerable and debasing conditions has been due in largest part to the refusal or failure on the part of the medical profession in these countries, to meet in adequate form the fundamental medical needs of the peoples involved, or at least to show clearly where these needs are met. Whether or no legislative enactment of similar character lies before us we do not know. Since with us medical legislation lodges, for the most part, with each of the forty-eight states in the Union it is not probable that there will be any attempt at countrywide legislation of a similar character. We are confronted today, however, with the prospect of an enormous expansion of state medicine and hospitalization by those seeking government relief of non-service disability in Veterans' Hospitals and Bureaus. This project is being fostered politically in spite of the fact that the number of hospital beds now available in the country is adequate for the needs and that there are at hand methods of securing adequate medical service for the

veterans, other than by the provision of new hospital beds. These methods would meet the needs, would provide better service without removing the individual from his immediate locality—an expensive and disruptive procedure—and at the same time would avoid an enormous addition to the already over-weighted tax burden.

It may be that we are fortunate in this country in the fact that medical legislation lodges with the States and this fact may minimize the tendency to crank legislation since the questions involved are brought more nearly home to the people concerned. Further, an experiment in medical economics shown to be impractical in one state can be avoided by others.

In studying the needs of our profession, it is well to bear in mind that we exist primarily not for our own welfare, but to provide a certain service to the public. The public interests are paramount and come before our own. In the statement of principles of medical ethics they are declared to be primarily for the good of the public and we should bear in mind in every consideration that only in the degree that we serve the public needs can we hope for, or receive, public approval. In planning our relations to the public, however, there is a question to which I should like to invite your attention. It is this. Who is best fitted to understand the needs of the public when considering the forms of medical service? Is it the physician as representative of the medical profession, or is it the politician as a representative of the public, where, after all, final action will be lodged. Occupied as we are with better things, we are too prone to

believe that our point of view from its own weight and rectitude will prevail. The man, or the profession, that relies alone on these essential features to advance his cause, is doomed to disappointment. *For success in the economics of medicine, as well as in the science and art, the master word is work.*

It seems clear that if we, as a profession, can command effective leadership and exhibit wisdom and capacity, we can continue to provide in adequate form and with proper costs the needed service. This will require constructive statesmanship and unending effort. By these means the danger of political control, of debasing conditions and of state medicine can be greatly minimized; and if they are avoided, it will be by these means alone.

The American College of Physicians will continue to stress the importance of adequate training as preparation for service in medicine. It will continue to put character in the forefront of requirements of the physician. Medical science will be served and every effort will be made to encourage those who, without thought of self, labor unceasingly in the laboratories and in the wards that the boundaries of knowledge may be extended.

The study of the history of medicine will be encouraged and the cultural value of a knowledge of our past will receive recognition. Knowledge, and the power that knowledge gives, will be fostered at every opportunity. These aims have become a part of the things for which the College is known to stand.

Is it time that the College should move out from this more delightful

realm into a consideration of fields not only cultural but economic? If we were living only so long ago as the date of our charter we could, with perfect equanimity and justification, limit our deliberations to the quieter and more enjoyable features of our profession. It would be a joy to step into the study, the laboratory or the ward and to let our considerations be confined within those walls. If we could be sure that the walls would continue to shelter us this might be a safe procedure. It would certainly be the most delightful life to most of us.

Sixteen years, however, have led us into an era of changes in the economic structure more rapid than we yet realize. Like all life, medicine is not static but is dynamic. Its dynamic power, however, is only what we, collectively and individually, make it. With an active and virile membership reaching into every corner of the land it is necessary that we give consideration, not only to our science, our culture and our comfort, but that we take an active part in the changes in the economic structures on which we stand. Our part can best be the encouragement of the method of science, the processes of trial and error in fitting the service of medicine to the needs of the community. Medical knowledge has been won by long and arduous application. The road by which we can arrive at an equal understanding of the economic values in medicine is equally long. There can be no loitering if we are to continue to lead. There is much to learn along the way and it is only by entering the path that we can expect to follow it.

Editorials

THE SAN FRANCISCO SESSION OF THE AMERICAN COLLEGE OF PHYSICIANS

As the special train of the American College of Physicians made its way westward, gathering small increments at various junction points but with its total passenger list not exceeding seventy-five persons, the statement was frequently heard that it was exceedingly unfortunate that for this year of all years a far-western city had been chosen as the place of meeting of the College. Pessimistic prophecies were voiced as to a probable failure of attendance for it seemed very evident that Fellows from the Middle West as well as from the East were finding it impossible to make the journey. The postponement of various European congresses was mentioned frequently as indicating the difficulties facing such organized endeavors. Yet when San Francisco was reached and there was opportunity to circulate among the gathering throng it was evident that pessimism was ill-founded. This became a certainty when at session after session of the general meetings the Ballroom of the Palace Hotel was found to be filled to capacity. Official figures of the registration at the Sixteenth Annual (San Francisco) Clinical Session are now available. The total attendance was 1,585, consisting of 132 visiting ladies, 107 exhibitors and 1,346 members and guests. It is

true that the attendance was largely contributed to by those resident in the Pacific States, who furthered the success of the undertaking by their commendable zeal and loyalty. Yet the wide geographical distribution of those registering was a source of surprise and of gratification. The only states not represented in the attendance were Alabama, Arkansas, Georgia, New Hampshire, Rhode Island, South Carolina, Virginia, and Wyoming. China, Hawaii, and Panama were each represented by a single registrant. In order of numbers attending from each state, California was first; Oregon, second; Washington, third; Minnesota, fourth; Pennsylvania, fifth; and New York, sixth.

The General Sessions have established an impression, which has been voiced by many, that taken collectively they constitute the outstanding annual event in Internal Medicine in this country. The San Francisco Meeting went far to confirm this feeling. The wealth of material, the general excellence of presentation, and the skillful grouping of related subjects all showed the wisdom with which the program was organized. The sustained attendance throughout meetings which were rather too long, and too hurried, showed that the General Sessions were appreciated.

The richness of the clinical material which San Francisco and the neighboring communities set before their visitors must be mentioned also. Mem-

bers and guests were in a more or less constant state of mental unrest in endeavoring to choose among the many programs offered. On the clinical programs there were about 500 presentations. Herein has developed a source of embarrassment for the Editor of the *ANNALS* as well. In its present convenient size, with the scientific material limited to approximately 1,500 pages for a year, the *ANNALS* can publish about 140 papers in each annual volume. The General Sessions provide about 65 papers, which are considered primarily to belong to the College and already earmarked for the *ANNALS*, if suitable. Due consideration must be given to the continual influx of manuscripts throughout the year from which choice must be made, for the pages of the *ANNALS* must not be restricted to material presented at the Annual Session. If, from this group of material, an amount is chosen equal to that derived from the General Sessions, it is evident at once that but few papers from the clinical programs can be published. This is greatly to be regretted for many of the clinical presentations have been quite as significant and as admirably done as those upon the general program. So great is the total volume of material available that any increase in the size of the *ANNALS*, within reasonable limits, could not appreciably relieve the situation.

CIVIC PRIDE AND PUBLIC HEALTH

Municipalities may properly boast of their natural advantages, their parks, public buildings, and commercial and industrial development, but one of the best measures of the intelligence, so-

cial-mindedness and governmental efficiency of a community is its public health record. Too often claims in this field are presented only as generalities, expressed by such terms as 'healthy,' 'healthful,' or 'salubrious'. The Journal of the American Medical Association has rendered an important service in this respect by the publication of an annual comparative survey of the typhoid fever death rates in the large cities of the United States. The twentieth report* in this series has recently appeared. It is particularly the group of food- and water-borne diseases which would appear to provide the best index of the success of the public health endeavor of a community. In the report of the survey to which reference has been made, twelve cities of more than 100,000 population are placed on the honor roll as having had no deaths from typhoid fever during the year 1931. These are Cambridge, Des Moines, Fall River, Flint, Long Beach, Lynn, Reading, Somerville, South Bend, Utica, Waterbury, and Wichita. Fifty additional cities had rates ranging from 0.1 to 1.9 deaths per hundred thousand, and five of these reported that all of their typhoid deaths were of nonresidents. The non-resident deaths create a problem for it is obviously as unfair to exclude certain of them as it is to include all. A uniform and fair method of distributing them is not available. Another element of unfairness is introduced by the necessary inclusion of the post-vacation cases. This problem is world wide. It is the chief source of typhoid

*Typhoid in the large cities of the United States in 1931, Jr. Am. Med. Assoc., 1932, xcii, 1550-1552.

morbidity and mortality in many large cities—Vienna, for instance. Perhaps the inclusion of deaths from typhoid fever in the resident population when the infection has been acquired away from home, is justifiable on the ground that the community shares the responsibility of securing protective vaccination for its citizens who seek a more primitive mode of life for their vacation period. So low is the total number of deaths from typhoid fever in most communities, a single sharply localized outbreak may play havoc with an otherwise good record. Twenty out of the thirty-one deaths in Cleveland in 1931 occurred in an outbreak at the State Hospital for the Insane. This institutional epidemic gave Cleveland a rate of 3.4, while without it the rate would have been 1.2. A low rate, i.e., less than 1.0 per hundred thousand, in a large city may indicate a greater achievement than a 0.0 rate in

a community of much smaller size. The most gratifying results are those which show a consistent improvement over a period of years in the course of which a relatively high rate has been brought down to the minimal figures of the first rank. Milwaukee, for instance, has changed a rate of 27.0 for the period 1906-1910 to 0.3 for 1931. Chicago had a rate of 15.8 in 1906-1910, and of 0.4 in 1931. Cincinnati has advanced from a rate of 30.1 in 1906-1910 to 0.4 in 1931. Many such examples exist. Comparative studies of the type presented in this survey lead to a very proper spirit of emulation among municipalities. This stimulating analysis can be applied not only to morbidity and mortality from infectious diseases but also to such public health problems as arise from automobile accidents, injuries associated with crimes of violence, and suicide.

Abstracts

Cancer and Tuberculosis, with some Comments on Cancer and Other Diseases. By EDWIN B. WILSON and HELEN C. MAHER. (Am. Jr. of Cancer, 1932, xvi, 227-250.)

From pathological and epidemiological evidence opinions at variance with one another have been arrived at in respect to the simultaneity of cancer and tuberculosis. Some have maintained that cancer and tuberculosis are antagonistic, some that one disease favors the occurrence of the other, and some that the incidence and progress of the two conditions are independent. (This question has been considered previously in the ANNALS: 1929, iii, 495-500; and 1929, iii, 501.) The difficulties involved in arriving at a sound judgment and the various statistical fallacies which must be avoided or mini-

mized are considered in the course of a mathematical treatment of the problem. It was concluded that there seems to be little or no evidence in favor of an antagonism or dissociation between cancer and tuberculosis and a considerable variety of evidence in favor of a slight degree of positive association between the two. Until better estimates of morbidity rates are available one should not be dogmatic over the matter and may well admit that for practical purposes cancer and tuberculosis may be regarded as independent. There seems to be considerable evidence that cancer of the esophagus is associated with pulmonary tuberculosis, as might perhaps be natural if the condition resulted in a long-continued malnutrition. At present there seems to be

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no material which should lead to a judgment as to whether cancer and tuberculosis tend to originate in the same persons because of constitutional diathesis, or whether the association might result merely from an invasion of one of the processes by the other or a lowered resistance to the progress of one of the diseases owing to a debilitation by the other.

Lead Poisoning in Children. By H. S. MITCHELL, M.D. (Canad. Med. Assoc. Jr., 1932, xxvi, 546-549.)

Lead poisoning in children exhibits certain peculiarities which require emphasis. Unlike the usual occupational hazards of adults, the exposure is more subtle. The juvenile system reacts more severely to a much smaller exposure, and the manifestations of intoxication are different. Except in rare instances of food-poisoning, lead is usually acquired as a manifestation of pica. Lead painted chairs, toys, and cribs [also porch railings, Editor] usually furnish the source. Such objects may be found to be devoid of paint in the areas which can be reached by the mouth. Children with lead poisoning are usually more or less irritable, but they seldom complain of colic. Constipation is almost invariably present, but seldom remarked upon by the parents unless they are questioned about it. There is usually some pallor. A lead line may be present, but less constantly than in adults. Peripheral neuritis frequently develops, and the legs are more often attacked than the upper extremities, in contrast to adult cases. Most important of all are the frequent cerebral manifestations which may be abrupt in onset. Two cases are presented illustrative of lead poisoning in children. One was referred as a case of poliomyelitis because of wrist- and foot-drop, and the other for generalized convulsions of sudden onset. The second case showed a heavy epiphyseal line upon x-ray examination. Treatment is discussed with due regard to the principles of preliminary concentration and fixation of the lead in the bones (especially important in presence of neurological crises) and subsequent slow elimination.

Coronary Disease in 100 Autopsied Diabetics. By M. H. NATHANSON, M.D.

(Am. Jr. Med. Sci., 1932, clxxxiii, 495-503.)

Since the discovery of insulin, the clinical picture of diabetes has been changing. Whereas before, malnutrition, infection, acidosis, and coma were the chief dangers, vascular disease is now playing a greater part. Joslin has reported that since the introduction of insulin the deaths from vascular disease in diabetics have increased from 28 to 47 per cent. In the present study the records of 100 diabetics were analyzed with special reference to the cardiovascular pathology. The coronary arteries were considered as diseased only when there was marked sclerosis with definite narrowing and partial obliteration of the lumen of one or more large branches. The results were controlled by comparison with the incidence of coronary sclerosis in general autopsy material. The entire series of 100 autopsies upon diabetics showed an incidence of severe coronary disease of 41 per cent. Above the age of 50 years the incidence is 52.7 per cent as compared with 8 per cent in a series of non-diabetics of the same age. The frequency of coronary disease was found to be almost as high among the female diabetics as among the male. In diabetics with gangrene, the incidence of coronary disease was higher than in the uncomplicated cases. The essential cardiac lesion in diabetes is coronary sclerosis. Other types of cardiac disease are of relatively rare occurrence.

Renal Function in Exophthalmic Goiter and Myxedema. By J. LERMAN, M.D., and A. J. BROGAN, M.D. (Endocrinology, 1932, xvi, 251-256.)

Because of a number of circulatory antitheses between exophthalmic goiter and myxedema it seems probable on purely *a priori* grounds that the effect would be to increase renal function in exophthalmic goiter and to decrease it in myxedema. A total of 75 patients with exophthalmic goiter and 22 with myxedema were tested by means of the phenolsulphonephthalein test as described by Rowntree and Geraghty. It was found that the renal function of myxedema patients, as determined by this method, is slightly but consistently lower than that of exophthalmic goiter patients in all age groups except in

the group 60 years of age and over. The function in both diseases is probably within normal limits. In exophthalmic goiter renal function varies with age. Up to the age of 50 the function is more or less constant, but after 50 it diminishes rapidly. In the smaller group of myxedema patients studied, such a correlation with age did not appear. No relationship was found between the degree of phthalein excretion in exophthalmic goiter and myxedema on the one hand and the basal metabolic rate or the degree of anemia on the other. A slight relationship between phthalein excretion and pulse pressure was found in myxedema only. Thus the data presented offered no support to the concept that permeability of renal tissue is significantly altered in hyperthyroidism or myxedema.

The Dynamic Bronchial Tree. By CHARLES C. MACKLIN, M.D. (Am. Rev. Tuberculosis, 1932, xxv, 393-417.)

An attempt is made to visualize the *locus* of pulmonary tuberculosis. The purely conducting part of the bronchial tree (that is everything up to, and including, the fine, smooth-walled bronchioles) is envisaged as undergoing a lengthening with inspiration and a shortening with expiration, and the details of this process are explained with diagrams. The peculiar shape and mode of action of the pleural cavity make it necessary to shift the lower part of the lung during inspiration in a downward, forward and outward direction, if the part above and behind the hilum is to expand properly. The root of the lung is of very great importance in this movement, of which the reverse phase is seen in expiration. It is suggested that the normal flexibility of the root may be impaired from disease processes, and that this will hamper lung ventilation, especially in that part lying above and behind the hilum. The advisability of ascertaining the normal range of movement in the root, particularly in children, is stressed, and the possible relation of interference with this movement to pulmonary tuberculosis advanced. (Author's abstract.)

A Thyroid Hormone in the Blood and Urine in Graves' Disease. By LEO R. HIMMEL-

BERGER, Ph.D. (Endocrinology, 1932, xvi, 264-266.)

In addition to applying the biological test described by Dresel to the blood of 24 patients diagnosed clinically as exophthalmic goiter, the urine of 17 of the same group was similarly investigated. In but 13 of these did the mice live to complete the test. The hormone test on the urine was positive in 10, indefinite in 1, and negative in 2. These two patients lacked the lymphoid tissue in the thyroid which is considered indicative of Graves' constitution. It was concluded that when the blood serum or urine from patients with Graves' disease is injected into mice, a substance capable of disturbing liver function can be demonstrated. In the limited number of cases studied, the presence of the hormone was found to parallel the presence of lymphoid tissue in the resected thyroid glands, thus lending further support to the view that lymphoid areas are an essential part of the pathological picture in Graves' disease. It is suggested that the demonstration of this hormone in the urine or blood serum might be useful as an aid in differential diagnosis and that the method should prove to be of value in the experimental study of Graves' disease.

The Distribution of Blood Cholesterol in Cancer. By HELEN R. DOWNES, Ph.D., and GEORGE T. PACK, M.D. (Am. Jr. of Cancer, 1932, xvi, 290-296.)

Various studies of the cholesterol content of the blood in cancer have been undertaken from time to time. One of the most promising results was the observation of Mattick and Buchwald, in 1928, that in 85% of the 100 cases of cancer studied by them, the cholesterol content of the plasma was found to be higher than that of the whole blood, while 80% of the healthy persons studied showed this relationship reversed. In the present investigation it was found that there was no constant relationship between the concentration of cholesterol in the whole blood and in the plasma in a series of 63 cases of malignant tumors and allied blood diseases. The cholesterol content of the blood was not increased above normal in the presence of cancer.

Reviews

The Practitioners Library of Medicine and Surgery. Supervising Editor, GEORGE BLUMER, M.A. (Yale), M.D., F.A.C.P.; David P. Smith Clinical Professor of Medicine, Yale University School of Medicine; Consulting Physician to the New Haven Hospital. *Volume I: Anatomy and Physiology as Applied to Practical Medicine.* Associate Editors: HARRY BURR FERRIS, B.A., M.D., E.K., Hunt Professor of Anatomy, Yale University School of Medicine; and HOWARD W. HAGGARD, M.D., Associate Professor of Applied Physiology, Sheffield Scientific School, Yale University. xlv + 1271 pages, 344 illustrations. *Volume II: The Technic of Clinical Medicine.* Associate Editor, JOHN T. KING, JR., A.B., M.D., F.A.C.P., Associate in Clinical Medicine, Johns Hopkins University School of Medicine. xlii + 984 pages, 227 illustrations. 1932. D. Appleton and Company, New York and London. Price \$10.00 a volume.

The two volumes under review are the first to be issued in The Practitioners Library of Medicine and Surgery. The entire set will consist of twelve volumes of which the last will be a composite index. Although each volume covers a unit area in the field of medical practice the entire set is so correlated as to present all that the editorial staff considers fundamental and essential. There are certain objections that are currently urged against such encyclopedic systems of medical practice, such as that they soon become out of date and that, after all, the very point upon which one wishes information is seldom covered. These objections of necessity have something of truth in them. But carefully selected material brought up to date by those who are experienced in its practical applications is rarely set aside within a short period of time. No one expects a medical text to be a complete guide throughout a lifetime. Judged as a piece of laboratory equipment, such a set

as The Practitioners Library should be expected to depreciate, but the practitioner will find that the rate of depreciation to be charged off is very much less than that which he must apply to most of the mechanical aids which he puts in his garage and in his examining room. As to completeness, each of the more than two hundred contributors has been chosen for his special fitness for presenting his subject. That must be the chief earnest of inclusion of the essentials. Brief bibliographic lists at the end of each chapter direct the reader to the chief sources of more detailed information. This set is not planned for the medical teacher or investigator in close contact with a large medical library. Rather, as its title states, it is for the practitioner. For him such a work is nearly indispensable. It is quite impossible for him to surround himself with separate monographic works to cover the entire field of his work. Even if he has many of them at hand, he can have a working familiarity with but a few. Hence is evident the value of an elaborately indexed, well-considered presentation of the entire range of medical practice.

Volume I: Anatomy and Physiology as Applied to Practical Medicine. Seven chapters are devoted to anatomy and twenty to physiology. Any detailed consideration is impossible. The authoritative position of the authors responsible for the individual chapters is indicated by the fact that Davenport writes on Heredity; Blumer, on Constitutions; Eyster, on Physiology of the Circulation; Henderson, on Respiration; Best, on Pancreatic Function; Thomson and Collip, on the Endocrine Glands; Gay, on Infection and Immunity; and Karsner, on Inflammation, to mention but a few.

Volume II: The Technic of Physical and Laboratory Examination in Clinical Medicine. In twenty-seven chapters the methods of examination in clinical medicine from History Taking to Oral Diagnosis, are sys-

tematically presented by authors equally as eminent in their respective fields as those contributing to the first volume. Naturally, there is no occasion for giving detailed directions for all bacteriological and histopathological procedures, but those considerations which will best enable the practitioner to secure effective cooperation from the laboratory experts to whom he must occasionally appeal are fully set forth.

Each volume is indexed separately in anticipation of the final composite index. The format is practical, and well chosen illustrations are liberally used.

Clinical Roentgen Pathology of Thoracic Lesions, by WILLIAM H. MEYER, M.D., Professor of Roentgenology in the New York Post-Graduate Medical School of Columbia University, and Director of Roentgenology in the New York Post-Graduate Hospital. Octavo, 272 pages, 183 illustrations. Lea & Febiger Co., Philadelphia, 1932. Price \$6.00.

Rarely does one encounter a book written for specialists which is as valuable to the internist, the surgeon and to all those working in clinical medicine as this volume, the first of a series, each devoted to some major division of roentgenology. As the title indicates, the discussion is here limited to diseases of the thorax so that after an introductory resumé of general roentgenological principles, separate sections are devoted to diseases of the thoracic cage, special diseases of the respiratory system, lesions of the heart and pericardium, and the esophagus and subphrenic organs in relation to intrathoracic pathology. In general, the material of these sections is treated in a systematic manner using such subheadings as disturbances of development, inflammation, neoplasms, etc. In terse, lucid sentences the roentgenological features of each type of disease process are given together with sufficient information of a gross pathological nature to demonstrate the physical bases of the deviations in illumination and configuration observed. The utilization of a large number of illustrations makes the work essentially an atlas of this division of roentgenology. The many white-on-black line plates are strikingly effective both from the

straightforward simplicity of their execution and the superior press work in evidence. These complement and immeasurably aid the explanation of the many half-tone reproductions of roentgenograms, the latter being distinguished for their wealth of detail and delicacy of tonal gradation. Not the least among the many excellent features of this book is the detailed index giving the pages for the main discussion together with the pagination of all other important collateral developments. By this means the bulk of the volume has been maintained at a minimum, since repetition has been almost entirely avoided. Considering the compactness of the volume, it would appear that the publishers, in setting a price for the book, have anticipated a far more limited sale than it deserves; for all those having any contact whatever with roentgenological interpretation will find here a compendium of the most useful information.

A Hand-Book of Ocular Therapeutics. By SANFORD R. GIFFORD, M.A., M.D., F.A.C.S., Professor of Ophthalmology, Northwestern University Medical School, Chicago, Illinois; attending Ophthalmologist, Passavant Hospital, Wesley Memorial Hospital, Evanston Hospital. 272 pages; 36 engravings. Lea & Febiger, Philadelphia, 1932. Price, \$3.25.

This is an outstanding work done by a man whose wide clinical experience and intimate association with his father, Harold Gifford, have given him a firm basis for reliable opinion. The book deals with the various therapeutic measures in a clear concise manner, giving his personal clinical experiences where there are conflicting opinions. The more recent advances are discussed giving special technique and illustrations for procedures not yet commonly followed. The section devoted to anesthesia is complete and well illustrated. Drugs are discussed from the standpoint of preparation, properties and administration, and those most commonly used are listed in a convenient manner. The present status of tuberculin therapy is made clear. The preparation and dosage are listed. The uses of phototherapy, diathermy, and roentgen ray are well covered. Foreign protein is given

full consideration in the treatment of iritis and uveitis. The author is particularly enthusiastic in his treatment of gonorrheal ophthalmia by this method. It is doubtful, however, if other experienced clinicians will discard the use of mild silver-protein in this and other purulent ophthalmias. Copper stick is recommended for treatment of trachoma in the early stages. The book covers in condensed form a great amount of work in the field of ocular therapeutics. Adequate bibliographies are provided should the reader desire further information. The value of Dr. Gifford's handbook is unquestionable and practically every ophthalmologist will find it useful.

CECIL LEPARD, M.D.

Recent Advances in Bacteriology and the Study of the Infections. By J. HENRY DIBLE, M.B. (Glas.), F.R.C.P.; Professor of Pathology in the University of Liverpool; Late Professor of Pathology in the University of London, and Professor of Pathology and Bacteriology in the Welsh National School of Medicine. Second edition. xi + 476 pages, 29 illustrations. P. Blakiston's Son and Co., Inc., Philadelphia, 1932. Price \$3.50.

Like many others of the Recent Advances Series, the member dealing with bacteriology has required a new edition although the former one has been out but three years. This is not to be wondered at for bacteriology, which some had come to look upon as a well-tilled, and all but exhausted, field, is rapidly developing aspects which, while not entirely new, are nevertheless setting off the new bacteriology rather definitely from the old. New sections on certain of the virus diseases, Brucella infections, the flocculation tests for syphilis, the Salmonella group, and antigenic structure have been required. Throughout, the text has been reworked in the light of the newer developments with special attention to the streptococcus group, bacterial variation, the bacteriophage, B. C. G., and specific soluble substances of the pneumococci and other bacteria. The author weighs the presumptions in regard to the Lübeck disaster and without drawing a fixed conclusion writes, "A slowly increasing body of evidence which supports Petroff's views

of the constitution of B. C. G. make[s] it possible that some special conditions obtaining during the culture of the vaccine at Lübeck may have caused the emergence of a virulent strain." Nor is the above sentence quoted to call attention to the ungrammatical verb, for the book is unusually free from errors in agreement and in typography. Rather was it quoted with approval as indicating a conservative attitude of quasi-acceptance of a view generally unpopular. This book can be heartily recommended to every practitioner of medicine who must keep informed of the rapid transformation in bacteriology but who obviously cannot seek this widely disseminated information out for himself from the original sources. It is also an invaluable reference book for medical libraries of all types, whether in teaching institutions or hospitals.

Functional Disorders of the Gastrointestinal Tract. By WILLIAM GERRY MORGAN, M.D., F.A.C.P.; Professor of Gastroenterology, Georgetown University Medical School; Consulting Physician, Georgetown University Hospital, Garfield Memorial Hospital, and Gallinger Hospital, Washington, D. C. xii + 259 pages, 32 illustrations. 1931, J. B. Lippincott Company, Philadelphia and London. Price \$5.00.

This concise, practical manual of gastrointestinal functional disorders is a unit in the Everyday Practice Series which is being brought out under the Editorship of Harlow Brooks, M.D., F.A.C.P. It is covered with the attractive *fac simile* antique binding characteristic of this series. Gastrointestinal disorders with demonstrable tissue changes are excluded from the scope of this manual, yet the so-called "functional" diseases play such a large part in everyday medical practice that a work devoted entirely to them is amply justified. In the words of the distinguished editor of this series, "This little book is designed especially to consider these disturbances of the gastrointestinal tract in such a manner as to make their recognition and proper management plain and clear. The book has been prepared by a practitioner widely known especially for his therapeutic skill in the management of cases of diseases of the gastrointestinal

tract." Numerous citations of illustrative cases and full discussions of treatment add to the interest and value. This book deserves a wide circulation.

Varicose Veins with Special Reference to the Injection Treatment. By H. O. MCPHEETERS, M.D., F.A.C.S.; Director of the Varicose Vein and Ulcer Clinic, Minneapolis General Hospital; Attending Physician New Asbury, Fairview, and Northwestern Hospitals, Minneapolis, Minn. Third revised and enlarged edition. 285 pages, 62 illustrations. F. A. Davis Company, Philadelphia, 1931. Price \$4.00.

For this third edition of McPheeter's work on Varicose Veins various sections

have been rewritten and considerable new material added. While intended particularly as a guide to the treatment of this condition by the injection method and therefore giving considerable space to the essential technical details, there are a number of subjects discussed which are of interest to the general practitioner and to the internist. Such are etiology, the reasons for the comparative rarity of pulmonary infarctions following the induction of thrombosis, coincident vascular complications, the management of varicose ulcer and the elephantoid condition of the lower leg due to lymphatic obstruction. The book is well written, well illustrated and well printed.

College News Notes

MINUTES OF THE BOARD OF REGENTS

San Francisco, Calif.

April 4, 1932

(The following items are abstracted from the official minutes.)

The Board of Regents of the American College of Physicians met and was called to order at the Palace Hotel, San Francisco, Calif., at 11:00 A. M., by the President, Dr. S. Marx White, Minneapolis, Minn.

The following were present: Dr. S. Marx White, Dr. James R. Arneill, Dr. David P. Barr, Dr. Walter L. Bierring, Dr. George E. Brown, Dr. James B. Herrick, Dr. Charles G. Jennings, Dr. Clement R. Jones, Dr. Noble W. Jones, Dr. J. C. Meakins, Dr. James H. Means, Dr. John H. Musser, Dr. George Morris Piersol, Dr. Maurice C. Pincoffs, Dr. Francis M. Pottenger, Dr. W. Blair Stewart, and Mr. E. R. Loveland, Executive Secretary.

President White spoke briefly concerning the completed arrangements for the meeting. He expressed the opinion that the subject of the next meeting place should be carefully studied, and that the meeting for 1933 should be held in a center which would attract a large attendance.

The Executive Secretary read abstracted Minutes of the last meeting of the Board of Regents, which were approved as read.

The Executive Secretary read the following excerpt from a letter addressed to President White from Dr. Oswald T. Avery:

"Confirming my recent telegram, may I again tell you how deeply I appreciate the honor conferred on me by the American College of Physicians. As the first recipient of the award, I feel particularly complimented, especially so since the recognition comes from a distinguished group of clinicians as an expression of their regard and appreciation of research in one of the allied sciences of medicine. In giving this distinction to the work in which I have been privileged to share, I am conscious that in even larger measure they are paying a high tribute to the spirit and accomplishment of all who by observation and experiment are attempting to add to our knowledge of disease.

"Thank you very much for your generous allotment of forty minutes for my address. I feel, however, that I may be encroaching upon time that might more fittingly be given to others on the program. In fulfilling the conditions of the award, I shall, of course, be happy to comply with your request, and on this occasion, if you so desire, suggest the following title for my remarks, 'The Role of Specific Carbohydrates in Pneumococcus Infection and Immunity.'"

Resignations of the following were duly accepted:

- Dr. William Willis Anderson (Fellow), Atlanta, Ga.
 Dr. L. R. DeBuys (Fellow), New Orleans, La.
 Dr. Rufus T. Dorsey (Fellow), Atlanta, Ga.
 Dr. G. C. Kilpatrick (Fellow) Mobile, Ala.
 Dr. William Magner (Fellow), Toronto, Ont., Can.
 Dr. Leon F. Shackell (Fellow), New Brunswick, N. J.
 Dr. Stewart H. Welch (Fellow), Birmingham, Ala.
 Dr. George S. C. Badger (Associate), Boston, Mass.
 Dr. R. Alexander Bate (Associate), Louisville, Ky.
 Dr. Jeter C. Bradley (Associate), Washington, D. C.
 Dr. Stephen Cahana (Associate), Milwaukee, Wis.
 Dr. L. E. Elliott (Associate), New Market, Iowa.
 Dr. Thomas A. Foster (Associate), Portland, Maine.
 Dr. Joseph M. Heller (Associate), Washington, D. C.
 Dr. Albert Kaufman (Associate), Wilkes-Barre, Pa.
 Dr. John D. Matz (Associate), Allentown, Pa.
 Dr. David N. Schaffer (Associate), Chicago, Ill.

In reply to an inquiry concerning the collection of dues for 1932, the Executive Secretary reported that he had distributed a letter with all bills on Jan. 1, suggesting that any one who found it impossible to pay his dues promptly might arrange through the Executive Offices for temporary deferment, or payment in monthly installments of said dues. Many letters of appreciation had been received from members, and, undoubtedly, a number of resignations were avoided.

Upon recommendation of the Committee on Credentials the following physicians were elected to Fellowship:

Allen, William Herschel, Fort Sam Houston, Texas.

- Amberson, J. Burns, Jr., New York, N. Y.
 Armstrong, Eugene Lawson, Los Angeles, Calif.
 Ash, Wilfrid Anthony, Seattle, Wash.
 Baltzan, David M., Sashatoon, Sask., Can.
 Barnhart, Grant Samuel, Washington, D. C.
 Benson, Robert Louis, Portland, Ore.
 Brooksher, William Riley, Jr., Fort Smith, Ark.
 Brown, Robert Osgood, Santa Fé, N. M.
 Callaway, Guy Drennan, Springfield, Mo.
 Carbonell, Arturo, Manila, P. I.
 Carley, Paul Sterling, New York, N. Y.
 Cassel, Homer Deeter, Dayton, Ohio.
 Cohen, Mortimer, Pittsburgh, Pa.
 Cole, William, Long Beach, Calif.
 Comstock, Daniel Delos, Los Angeles, Calif.
 Cook, Everett LeCompte, Denver, Colo.
 Cornell, Virgil Heath, Washington, D. C.
 Cowie, David Murray, Ann Arbor, Mich.
 Crawford, Paul Miller, Denver, Colo.
 Curtis, Arthur Covell, Ann Arbor, Mich.
 Dart, Raymond Osborne, Ancon, C. Z.
 Davis, Jay Conger, Minneapolis, Minn.
 Davis, Robert Gaylord, San Diego, Calif.
 Denton, William, Hot Springs Nat'n Park, Ark.
 Faust, Daniel Bascom, San Francisco, Calif.
 Gardam, Joseph William, Newark, N. J.
 Grant, Brooks Collins, Fort Sam Houston, Texas.
 Greenbaum, Sigmund S., Philadelphia, Pa.
 Gregg, Donald, Wellesley, Mass.
 Guardia, Tomas Guardia, Panama, R. P.
 Haines, Edgar Fremont, Washington, D. C.
 Henderson, George Dallas, Holyoke, Mass.
 Hill, Harold Phillips, San Francisco, Calif.
 Howard, Leroy Taylor, Fort Sam Houston, Texas.
 Hudson, Fredrick Edward, Stamford, Texas.
 Hyland, Clarence Michael, Los Angeles, Calif.
 Kern, Richard Arminius, Philadelphia, Pa.

La Barge, Oza Joseph, Salt Lake City, Utah.
 Ledbetter, Paul Veal, Houston, Texas.
 Lowry, Robert Henry, Fort Sam Houston, Texas.
 Lutterloh, Charles Hartzell, Hot Springs Nat'l Park, Ark.
 Madigan, Patrick Sarsfield, Washington, D. C.
 McKie, Alva Burton, Manila, P. I.
 Mebane, Douglas Hamilton, El Paso, Texas.
 Moffitt, Herbert Charles, San Francisco, Calif.
 Newcomb, Warner Haines, Jacksonville, Ill.
 Noble, Mary Riggs, Harrisburg, Pa.
 Oginsky, Maxim Alexander, Saratoga Springs, N. Y.
 Olch, Benedict, Dayton, Ohio.
 Olmsted, Bertram Henry, San Francisco, Calif.
 Otto, Frank Wesley, Los Angeles, Calif.
 Perlberg, Harry James, Jersey City, N. J.
 Pinner, Max, Tucson, Ariz.
 Pollock, William Cramer, Denver, Colo.
 Quickel, Herbert Lee, Denver, Colo.
 Rawls, William Bryant, New York, N. Y.
 Rice, William Frederick, San Francisco, Calif.
 Roberts, Frank Lester, Trenton, Tenn.
 Robeson, David Loran, Fort Monroe, Va.
 Ross, William Hugh, Brentwood, N. Y.
 Rothschild, Karl, New Brunswick, N. J.
 Ridisill, Hillyer, Jr., Charleston, S. C.
 Ruschhaupt, Louis F., Milwaukee, Wis.
 Rush, Homer P., Portland, Ore.
 Sale, Charles Wallace, Fort Sill, Okla.
 Schumacher, Irwin Clement, San Francisco, Calif.
 Sellers, Erle Dees, Abilene, Texas.
 Schroeder, William F., Rock Island, Ill.
 Sloan, Andrew, Utica, N. Y.
 Sweany, Henry Claris, Chicago, Ill.
 Traynor, Raymond Leo, Omaha, Nebr.
 Van Valzah, Shannon Laurie, Denver, Colo.
 Waldbott, George L., Detroit, Mich.
 Wehenkel, Albert Michael, Detroit, Mich.
 Weis, Clifford Robert, Dayton, Ohio.
 Wetterberg, Louis F., Woodbridge, N. J.

White, Samuel Augustus, Fort Benning, Ga.

Wile, Udo Julius, Ann Arbor, Mich.

Withers, Sanford Martin, Denver, Colo.

Woodland, John C., Ancon, C. Z.

Woodson, Thomas D., Washington, D. C.

Dr. Stewart, a member of the Committee on Insignia, of which Dr. Edgar Erskine Hume is Chairman, gave the following report:

"Our Committee will have to ask for further time for our final and complete report on the matter of academic dress. The reason for this is that the whole subject is coming up for reconsideration in Great Britain and also in the United States. I have been in touch with some of those who take particular interest in this subject, and am told that it would be wise for the American College of Physicians to wait until after June 1 to make a decision, as otherwise it might become desirable later to make a change. If other American academic and scientific bodies, as well as universities, are to reconsider all this, we should, I believe, await their report before making ours."

(Signed) Edgar Erskine Hume, Chairman

It was regularly moved and seconded that the above report be approved and placed on file.

APRIL 6, 1932

The Board of Regents of the American College of Physicians met and was called to order at the Palace Hotel, San Francisco, Calif., at 12:35 P. M., by the President, Dr. S. Marx White, Minneapolis, Minn.

The following were present: Dr. S. Marx White, Dr. James R. Arneill, Dr. David P. Barr, Dr. Walter L. Bierring, Dr. George E. Brown, Dr. James B. Herrick, Dr. Charles G. Jennings, Dr. Clement R. Jones, Dr. Noble W. Jones, Dr. J. C. Meakins, Dr. James H. Means, Dr. John H. Musser, Dr. George Morris Piersol, Dr. Maurice C. Pincoffs, Dr. Francis H. Pottenger, Dr. W. Blair Stewart, and Mr. E. R. Loveland, Executive Secretary.

The Executive Secretary read a letter from Dr. S. D. Van Meter, Chairman of the Effort and Invitation Committee of the American Association for the Study of Goiter, suggesting, first, that the American College of Physicians join other national

medical and surgical societies in extending an invitation for the Third International Goiter Conference to come to America in 1937; and, second, that the American College of Physicians appoint an official delegate to join the American delegation to the International Goiter Conference at Berne, Switzerland, at its next meeting to co-operate in bringing the International Goiter Conference to America in 1937.

After discussion, on motion of Dr. Biering, seconded by Dr. Arneill, and regularly carried, it was

RESOLVED, that the Executive Committee be empowered to appoint a delegate to represent the College at Berne, Switzerland, in connection with the meeting of the International Goiter Association without expense to the College.

ASSOCIATES

On behalf of the Committee on Credentials, Dr. Piersol presented the list of candidates recommended by the Board of Governors for election to Associateship. The following physicians were duly elected:

Alexander, Archibald Addison, Oakland, Calif.

Arrandell, Cad Walder, Ponca City, Okla.

Baer, Ridgely Waters, Frederick, Md.

Ball, Ralph G., Manhattan, Kansas.

Bell, John Kenner, Detroit, Mich.

Blitch, Clifford G., Jacksonville, Fla.

Bloom, Benson, Tucson, Ariz.

Brand, Alonzo F., Fayetteville, N. Y.

Briskman, A. Lee, Colorado Springs, Colo.

Burkley, George Gregory, Rochester, Minn.

Carman, Henry Franklin, Dallas, Texas.

Carns, Marie L., Madison, Wis.

Castell, Louis B., Washington, D. C.

Chernaik, Samuel Julius, New Britain, Conn.

Chrisman, William Walter, Macon, Ga.

Condry, Raphael Joseph, Elkins, W. Va.

Cronwell, Bernhard J., Jr., Austin, Minn.

Deegan, John Kenneth, West Haven, Conn.

Denison, Robert, Harrisburg, Pa.

Durgin, Lawrence Newton, Amherst, Mass.

Efron, Bernard G., New Orleans, La.

Esbenshade, John H., Lancaster, Pa.

Fineman, Abraham Harold, New York, N. Y.

Flack, Russell Allen, LaFayette, Ind.

Flipse, Mathew Jay, Miami, Fla.

Foord, Alvin G., Pasadena, Calif.

Fregeau, Aime N., San Francisco, Calif.

Gardner, Walter P., St. Paul, Minn.

Goldbloom, A. Allen, New York, N. Y.

Goldsmith, Leon A., Portland, Ore.

Goldstein, Eli, New York, N. Y.

Gordon, Douglas M., Ponca City, Okla.

Griffith, George Cupp, Philadelphia, Pa.

Hannah, William Sessions, Montgomery, Ala.

Harding, George T., III, Columbus, Ohio.

Hargrove, Marion Douglas, Shreveport, La.

Harmeier, John Watson, Rochester, Minn.

Harvey, James E., Pasadena, Calif.

Hastings, Gordon, Little Rock, Ark.

Hekimian, Ivan, Buffalo, N. Y.

Hiemstra, Wybren, Missoula, Mont.

Hookey, John A., Sr., Detroit, Mich.

Hunter, Melville Wallace, Monroe, La.

Huntington, Herbert Arthur, Los Angeles, Calif.

Ilsley, Morrill Leonard, Claremont, Calif.

Johnston, John M., Pittsburgh, Pa.

Kirby, Dunne Wilson, Philadelphia, Pa.

Kramer, Louis Irving, Providence, R. I.

Lane, Lowell L., Philadelphia, Pa.

Lawson, Herman A., Providence, R. I.

Lee, Russel Van Arsdale, Palo Alto, Calif.

Leivy, Frank E., Philadelphia, Pa.

Levin, Charles Morris, Richmond Hill, N. Y.

Lewis, Paul John, Yakima, Wash.

Lichty, John Max, Pittsburgh, Pa.

Markel, Albert G., Paterson, N. J.

McLain, Ernest K., Louisville, Ky.

Menard, Olive Joseph, Boston, Mass.

Milstead, Laurence C., Allentown, Pa.

Mitchell, Louis Albert, Newark, Ohio.

Murphey, Bradford J., Colorado Springs, Colo.

Nakada, James Robert, St. Louis, Mo.

Norris, Henry Martin, East Orange, N. J.

Nussbaum, Sydney, Brooklyn, N. Y.

Osgood, Carroll W., Milwaukee, Wis.

Pratt, Orlyn Bernard, Los Angeles, Calif.

Reed, Marjorie E., Plymouth, Pa.
 Safarik, Lumir Robert, Denver, Colo.
 Scott, Roy L., Buffalo, N. Y.
 Scott, Walter Roger, Niagara Falls, N. Y.
 Sears, Thad P., Denver, Colo.
 Sexton, Daniel Leritz, St. Louis, Mo.
 Shaw, John A., Fayetteville, N. C.
 Sheehan, George A., Brooklyn, N. Y.
 Simons, Samuel Shirk, Lancaster, Pa.
 Spanuth, John R., Reading, Pa.
 Squires, Willard Haywood, New York, N. Y.
 Stallings, Walker Eugene, Boise, Idaho.
 Taylor, James Edwin Campbell, Rochester, Minn.
 Terrell, Caleb O., Fort Worth, Texas.
 Weisler, Harry, Brooklyn, N. Y.
 Werner, August A., St. Louis, Mo.
 Wilson, James Alfred, Meriden, Conn.
 Ylvisaker, Lauritz S., Newark, N. J.
 Ylvisaker, Ragnvald S., Minneapolis, Minn.

Dr. Piersol stated that no doubt there would be a question in the minds of some of the Regents as to why some candidates whose names had been proposed for Fellowship appeared on the list of Associateship candidates. The reason for this was that according to the present By-Laws, all candidates proposed after the 31st of December, 1931, must be considered first for Associateship, and serve the three to five year period before they are eligible for proposal to Fellowship, except in the case of men of great prominence and distinction, who can, by order of the Board of Regents, be elected as Fellows. In some instances, men who were just elected to Associateship last year were proposed for Fellowship this year. Such men are not eligible for election to Fellowship, because they must remain Associates for at least three years before they are eligible to be proposed for Fellowship.

The Executive Secretary presented the report on the Committee on Exhibit at the Chicago Century of Progress in 1933 as follows:

"Your Committee consisting of Dr. Clement R. Jones, Dr. James G. Carr, and Mr. E. R. Loveland, appointed to study the advisability of an exhibit by the College at the coming exposition in Chicago, in 1933, desires to submit the following report:

"The Committee met at Rochester on Feb-

ruary 13 and spent several hours in conversation and discussion with Dr. T. E. Finnegan, Director of Educational Films for the Eastman Kodak Company, Mr. Edwards, the production manager, and Dr. Jones, the scenario writer. After considerable discussion the following plan was the only one which we felt could be recommended. This plan included the use of 1½ or 2 reels which would require some twenty to thirty minutes for each complete exhibition. One reel would be designed to present in motion pictures a complete physical examination, including the estimation of the blood pressure, a urine examination, a complete blood examination, and the taking of blood for a Wassermann test.

"The design was that the first reel or the first portion of the motion picture would present the physical examination as it ought to be done by any capable general practitioner; this to be followed by a further demonstration of special methods of examination regularly used by the specialist in internal medicine.

"For instance, if the routine physical examination suggested some question about the heart, the use of chest plates, of the electrocardiograph, and of the basal metabolimeter would be indicated; if the original examination raised a question as to disease of the gastro-intestinal tract, the x-ray, gastric analysis, stool analysis, gall bladder visualization and other allied procedures might be shown on the screen. It was planned that the second reel should include roentgenology as applied to the various problems of internal medicine, the electrocardiograph, and the basal metabolimeter; laboratory tests as related to the gastro-intestinal functions, to the gall bladder and to the blood and urine; special examination of blood for nitrogenous end-products, uric acid, bile pigments, etc. It would be our purpose to present to the public these various methods of special investigation with a view to instruction as to the importance of this special equipment and particularly as to the necessity for expert guidance of all these procedures and an interpretation of the results based on the experience and scientific training of the diagnostician.

"The cost of the reels alone is likely to be in the neighborhood of \$10,000. It is probable, so we gathered from the conversation, that the motion pictures might be procured for less than this. It is also possible that they might cost more. To this must be added, if such an exhibit is undertaken, a sum for retaining one or two young men to operate the machine. It is likely that two medical students might be found for this, each for half-time work. There might be in addition some expense for unexpected repairs. The members of the Committee feel that \$10,000 is probably a

minimum figure for the expense of such an exhibit.

"We have outlined a plan of procedure which might be followed if the Regents deem it advisable. However, the members of the Committee are unanimous in the opinion that the expense of such an exhibit would not be justified by the results. We all feel that in order to keep the exhibit within anything like reasonable cost the demonstration must be shortened until its value would become very questionable and our feeling is that it would be unwise for the College to undertake the exhibit proposed above."

On motion, seconded and regularly carried, it was **RESOLVED**, that the report of the Committee be approved.

On behalf of the Committee on Public Relations, Dr. Jennings submitted the following report:

"The Committee on Public Relations has considered the report of the sub-committee on Medical Education of the Committee on Medical Care for Children of the White House Conference on Child Health and Protection presented at the meeting of the section on medical service at Washington, D. C., February 20, 1931.

"The report deals extensively with the subject of Pediatric Education. Your committee recommends that the American College of Physicians heartily endorse the recommendations embodied in the report of the sub-committee on Medical Education, and express its appreciation for this able work in the interest of Pediatric Education."

On motion by Dr. C. R. Jones, seconded by Dr. Musser, and regularly carried, it was

RESOLVED, that the report of the Committee on Public Relations be and is herewith approved by the Board of Regents.

Dr. Pincoffs suggested that the Committee on Public Relations should have access to the editorial pages of the *ANNALS* to make public their endorsement of this work of the National Committee, if they so wish. He expressed the opinion that the Public Relations Committee would do well, instead of leaving their conclusions to be more or less buried in the Minutes of our meeting, to use the editorial pages as a means of putting before the whole College and the general medical public, the results of their investigations.

The Executive Secretary reported that he had been instructed to consult counsel concerning the possibility of restraining the

Pilgren Company from using the name of the American College of Physicians in their advertising with relation to a booklet "by the late Professor E. S. Bishop, M.D., Fellow, American College of Physicians, and Professor of Clinical Medicine". Counsel advised that since the Pilgren Company had now agreed to refer to Dr. Bishop, who actually was a Fellow of the College, as the "late" Professor Bishop, no further restraint could be enforced.

No action was taken by the Board of Regents on the above.

The Executive Secretary presented a list of Fellows and Associates whom he recommended be dropped from the rolls, because of more than two years' delinquency, as provided in the By-Laws; the list having previously been submitted to the Board of Governors.

On motion by Dr. Piersol, seconded by Dr. Arneill, and regularly carried, it was

RESOLVED, that the delinquent members be dropped from the rolls of the College.

In reply to an inquiry, the Executive Secretary made the following membership report:

Masters	5
Fellows	2286
Associates	572
Total	2863

The Executive Secretary presented the financial reports of the College for the year ended December 31, 1931, and the proposed budgets for 1932. In summarizing the financial operation of the College for 1931, he pointed out that the Endowment Fund now amounts to \$52,400 and the General Fund to \$57,166.71, or a total of \$109,566.71; whereas on January 1, 1927, the total assets were less than \$10,000.

The Treasurer, Dr. Clement R. Jones, commented on the work of the Treasurer's Office for the past year, and reported that \$2,325.44 additional had been paid by one of the closed banks, and that it seemed very probable that all the funds of the College in closed banks would be paid in full, and that the Exchange National Bank, in which the College had some \$5,000, would likely open for business again very soon.

On behalf of the Finance Committee, Dr. Jones presented the following resolution to be referred to the Committee on Constitution and By-Laws for report at the next meeting of the Board:

"That, within one month after installation, the President shall appoint a Finance Committee of three from the Board of Regents, which shall be authorized to have general supervision of the finances of the College; to select banks and trust companies as depositories for all College funds, after careful investigation as to the standing and reliability of such institutions. Said Committee shall have the power to authorize such banks to receive and pay money out of College funds upon the signature of the Treasurer or some Regent authorized by the Finance Committee; to invest the surplus and endowment funds of the College in such bonds as are approved for savings banks and estate trusts in Pennsylvania and New York, or other states with equal requirements.

"The Executive Secretary shall make a monthly report to the Finance Committee of all receipts and disbursements for the preceding month; and at least sixty days before the Annual Meeting the proposed budget for the coming year shall be submitted to the Finance Committee for consideration and recommendation at the Annual Meeting of the Board of Regents. All matters affecting the financial welfare of the College shall be referred to this Committee for consideration and report to the Board of Regents. The Finance Committee shall, at least thirty days before the Annual Meeting, submit to the Executive Secretary an Annual Report for submission to the Board of Regents of all moneys and investments and shall report at any other time when called upon by the Board of Regents or the Executive Committee. The Treasurer shall be ex officio a member of the Committee."

After considerable discussion, on motion by Dr. Bierring, seconded by Dr. Jennings, and regularly carried, it was

RESOLVED, that the report of the Treasurer be received and that the proposed resolution be referred to the Committee on Constitution and By-Laws for a report at the next meeting.

Discussion followed regarding the continuance of the present Finance Committee. It was suggested that the present Committee be continued, with Dr. S. Marx White substituted for the term of Dr. Pottenger, President-Elect.

On motion by Dr. Pottenger, duly seconded and regularly carried, it was

RESOLVED, that the Finance Committee for the coming year shall consist of Dr. Clement R. Jones, Chairman, Dr. Charles G. Jennings (1933), Dr. James S. McLester (1934), Dr. S. Marx White (1935), and Dr. Charles F. Martin (1936).

On motion by Dr. Pottenger, seconded by Dr. Meakins, and regularly carried, it was

RESOLVED, that the Finance Committee, at the next meeting of the Board of Regents, recommend certain banks as depositories, and that a resolution be passed delegating the banks recommended, to act as depositories; and also that the Finance Committee recommend who shall sign checks.

The Executive Secretary read the report of the Committee on Constitution and By-Laws, which was as follows:

"The Committee on Constitution and By-Laws at the request of President S. Marx White, who suggested the desirability of Honorary Fellowships in the College, submits the following:

Suggested Amendments to Constitution

"1. Add to Article III, Section 3, paragraph 1, after the word 'elect' in the second sentence the words 'Honorary Fellow and'.

"2. Article IV, first paragraph. Add after the word 'Masters' the following: 'There shall also be (c) "Honorary Fellows" as subsequently defined'.

"3. Article IV, following the sixth paragraph. '(c) Honorary Fellows. Upon nomination of the Board of Regents the College may elect medical men or women or scientists engaged in medical research to be Honorary Fellows. Such Honorary Fellows shall have all the privileges of members excepting the right of holding office or voting. They shall not pay dues nor receive the publications of the College or other similar prerequisites granted to members paying dues'.

Dr. Stewart stated he doubted the advisability of enacting this change, and that the general sentiment of the Committee on Constitution and By-Laws was not favorable to the adoption of the change.

On motion of Dr. Jennings, seconded by Dr. Pincoffs, and regularly carried, it was

RESOLVED, that the report of the Committee on Constitution and By-Laws be received and that recommendations in it be deferred.

It was recommended by Dr. Stewart that the resignation of Dr. William H. Deaderick as Governor of the State of Arkansas be accepted, due to the illness of Dr. Deaderick.

On motion by Dr. Jennings, seconded by Dr. Pincoffs, and regularly carried, it was RESOLVED, that the resignation of Dr. William H. Deaderick as a member of the Board of Governors be accepted.

On motion by Dr. Pincoffs, seconded by Dr. Bierring, and regularly carried, it was RESOLVED, that the present Committee on ANNALS OF INTERNAL MEDICINE be continued until permanent arrangements are made for a standing Committee on the journal.

Dr. Stewart stated that three or four of the officials in the College had recommended that the Editor of the ANNALS should be made an ex officio member of the Board of Regents, and that the Committee on Annals would be glad to co-operate with whatever action the Board desired.

On motion by Dr. Pincoffs, seconded by Dr. Musser, and regularly carried, it was RESOLVED, that the matter of the Editor of the ANNALS being made an ex officio member of the Board of Regents be referred to the Committee on Constitution and By-Laws.

The Executive Secretary announced that very cordial and complete formal invitations had been received from the cities of Pittsburgh, Chicago, Montreal and Indianapolis to hold the next Convention of the American College of Physicians in those cities.

Dr. Herrick, on behalf of Chicago, presented invitations from the Deans of the University of Chicago and Rush Medical College, Northwestern University Medical College, University of Illinois Medical College and Loyola University Medical College; likewise letters from Dr. A. R. Elliott, from the Chicago Medical Society, Illinois State Medical Society and the Chicago Association of Commerce.

Dr. Meakins stated that Dr. Martin, one of the former Presidents, had for some time been keen to have the College meet in Montreal and that they had decided to wait until it could be done properly; that he now had with him an invitation from Dr. Martin and from the two Universities of Mon-

trreal and the medical schools and hospitals, to hold the 1933 Clinical Session in Montreal.

Dr. Clement R. Jones presented in detail the advantages of meeting in Pittsburgh. It was the consensus of opinion that the 1933 meeting should be held near the center of population. Dr. Meakins stated that while the invitation from Montreal was for 1933 that they would be just as happy to have the meeting there in 1934, if the other members felt it would be more satisfactory to have the 1933 meeting in the United States. After considerable discussion, it was decided to defer decision as to the next meeting place until the next meeting of the Board of Regents.

Adjournment.

APRIL 8, 1932

The Board of Regents of the American College of Physicians met and was called to order at the Palace Hotel, San Francisco, Calif., at 12:45 P. M., by the President, Dr. Francis M. Pottenger, Monrovia, Calif.

The following were present: Dr. Francis M. Pottenger, Dr. James R. Arneill, Dr. David P. Barr, Dr. Walter D. Biering, Dr. George E. Brown, Dr. Charles G. Jennings, Dr. Clement R. Jones, Dr. Noble W. Jones, Dr. J. C. Meakins, Dr. James H. Means, Dr. George Morris Piersol, Dr. Maurice C. Pincoffs, Dr. W. Blair Stewart, Dr. S. Marx White, and Mr. E. R. Loveland, Executive Secretary.

The Executive Secretary read an abstract of the Minutes of the last meeting, which was approved as read.

After discussion regarding the standing Committee on ANNALS, on motion by Dr. White, duly seconded and regularly carried, it was

RESOLVED, that a standing Committee on ANNALS OF INTERNAL MEDICINE be constituted to consist of three members to be appointed by the President—one for a term of one year, one for a term of two years, and one for a term of three years; and, thereafter, at the expiration of the term of each member, the President shall appoint his successor for a period of three years.

There was a discussion of having a permanent Committee on Constitution and By-

Laws, whereupon on motion by Dr. White, seconded by Dr. Means, and regularly carried, it was

RESOLVED, that a standing Committee on Constitution and By-Laws be constituted—the President to appoint one member for one year, one member for two years, and one member for three years; and, thereafter, annually, the President, upon assuming office, shall appoint a member to succeed each member as his term expires.

On motion by Dr. White, seconded by Dr. Piersol, and regularly carried, it was

RESOLVED, that the Executive Committee be re-elected, with the addition of Dr. Walter L. Bierring to fill the place left vacant by the death of Dr. Aldred Scott Warthin.

The following members were therefore designated to serve on the Executive Committee: Dr. Francis M. Pottenger, Dr. Clement R. Jones, Dr. Walter L. Bierring, Dr. J. C. Meakins, Dr. James H. Means, Dr. James Alex. Miller, Dr. George Morris Piersol, Dr. Maurice C. Pincoffs and Dr. S. Marx White.

Nominations for Secretary General were made as follows: Dr. William Gerry Morgan, Washington, D. C., nominated by Dr. White, seconded by Dr. Piersol; Dr. William D. Stroud, Philadelphia, Pa., nominated by Dr. Means, and duly seconded. Voting was done by ballot. The tellers, after making their count, reported Dr. Morgan's election.

It was moved, seconded and regularly carried, that Dr. Morgan's election be made unanimous.

Upon nomination and unanimous vote, Dr. Elmer H. Funk, Philadelphia, Pa., was elected Treasurer.

Free discussion as to the next meeting place followed. It was decided that it was a matter for the Board of Regents to take action upon, and that a vote should be taken to determine the question.

The result of the voting was: Chicago, 1; Pittsburgh, 3; and Montreal, 9.

Dr. Jonathan C. Meakins was unanimously appointed General Chairman. It was suggested that the time of the meeting be set for some week in February, according to

the convenience of Dr. Meakins and his Montreal committees.

A discussion followed concerning financial procedures in the College. Upon motion regularly made, seconded and carried, it was

RESOLVED, that the depositories for the College funds be the present depositories, the First National Bank of Pittsburgh, the Colonial Trust Company of Pittsburgh, Union National Bank of Pittsburgh, Commonwealth Trust Company of Pittsburgh and an additional bank or banks selected in Philadelphia or New York after investigation by the Finance Committee.

Dr. C. R. Jones, Chairman of the Finance Committee, brought up the subject of having someone in addition to the Treasurer and the Executive Secretary authorized to sign either vouchers or checks, in case of the incapacity of either the Treasurer or Executive Secretary.

Upon motion by Dr. C. R. Jones, seconded by Dr. White, and regularly carried, it was

RESOLVED, that the Board of Regents empower the Chairman and the Vice Chairman of the Finance Committee to sign checks and/or vouchers for College funds, so that in case of incapacity of the Treasurer and/or Executive Secretary such funds would not be tied up.

On further motion by Dr. White, seconded by Dr. Stewart, and regularly carried, it was

RESOLVED, that the ex-Treasurer, Dr. Clement R. Jones, be empowered to sign checks until such time as the transfer of funds is made to the new Treasurer and recorded.

Dr. Clement R. Jones extended an invitation to the American College of Physicians to meet in Pittsburgh in 1934. He stated that Pittsburgh would continue preparing for the College, and that the College would not be disappointed when it finally selected Pittsburgh.

In answer to the question as to whether an Associate automatically becomes a Fellow, under the new plan, it was explained that inasmuch as the credentials or qualifications of a candidate change between the time of his election to Associateship and the time he may be proposed for Fellowship, the

Committee feels it desirable to have him re-proposed on the regular form for advancement to Fellowship at the proper time. He can be re-proposed by any Fellow of the College, seconded by another Fellow and endorsed by an Officer, Regent or Governor. The By-Laws provide that at the expiration of three years, Associates shall be notified in writing of their eligibility for proposal for

election to Fellowship within the next two years, providing they shall meet within that time the requirements necessary for Fellowship.

There being no further business, the meeting adjourned at 2:15 P. M.

E. R. LOVELAND,
Executive Secretary.

MINUTES OF THE BOARD OF GOVERNORS SAN FRANCISCO, CALIF., APRIL 4, 1932.

(Abstracted from the official minutes.)

The Board of Governors of the American College of Physicians met and was called to order at the Palace Hotel, San Francisco, California, at 4:15 P. M., by the Chairman, Dr. W. Blair Stewart, Atlantic City, New Jersey.

The following were present: Dr. W. Blair Stewart, Dr. Ernest B. Bradley, Dr. Charles H. Cocke, Dr. T. Homer Coffen, Dr. A. Comingo Griffith, Dr. Josiah N. Hall, Dr. Thomas Tallman Holt, Dr. Hans Lissner, Dr. William Gerry Morgan, Dr. G. G. Richards, Dr. Adolph Sachs, Dr. Rock Sleyster, Dr. Charles T. Stone, and Mr. E. R. Loveland, Executive Secretary.

The Executive Secretary read abstracted minutes of the last meeting of the Board of Governors, which were approved as read.

Dr. Stewart introduced Dr. Francis M. Pottenger, President-Elect, who spoke briefly on the importance of the work of the Board of Governors and the ultimate goal of the College. He said the future of the College is to be determined very largely by the Board of Governors; that a great deal of responsibility lies with the Board of Governors in passing upon the qualifications of young men proposed for membership; to encourage young men who are capable and desirable by helping them along; but not to recommend a man simply because he desires membership. Dr. Pottenger said that the following questions often arise: What is to be the future of our organization? What is its purpose? Shall we launch out into something more? What shall be our ultimate goal? His feeling was that we ought to take a firm stand

for Internal Medicine and all that it stands for; that we should be the greatest influence in America for Internal Medicine.

Chairman Stewart spoke briefly of his work as Chairman of the Board of Governors during the past year. He reported that the oldest member of the Board, Dr. Edward O. Otis, of New Hampshire, had asked to be kindly remembered to all members of the Board of Governors. Communications from other Governors who were unable to be present were also presented.

Upon request, the Executive Secretary read portions from the Constitution and By-Laws regarding requirements for admission to Associateship—especially those referring to the period of time a physician must be in active practice before he is eligible for proposal.

Upon request of Dr. Stewart, President White, who had just entered the meeting at this time, spoke briefly regarding the increased responsibility of the Board of Governors since the amendments to the Constitution and By-Laws adopted at the Boston Session in 1929 had become effective on January 1, 1932, namely, that all new members must enter the College first as Associates, and that all candidates for Associateship are passed upon first by the Board of Governors. Dr. White stated that these amendments had been incorporated in the Constitution and By-Laws because of the necessity for some mechanism by which there could be greater scrutiny and better opportunity for studying prospective Fellows of the College. The new arrangement provides that every physician in the future, except in very special cases, shall come in first

as an Associate, and shall be under the careful scrutiny of the Board of Governors and the Board of Regents for a period of three to five years before he shall be eligible for election to Fellowship. It will give the College a chance to study the physician in his relation to his profession, his responsibility, his attitude, his personality, etc.

President White further referred to another point of interest in the evolution of the College, as to whether the College should undertake functions which might be considered economic; that there will unquestionably be some drastic changes affecting medical economics, and that it is important to consider and discuss any participation the College may subsequently undertake.

Chairman Stewart read a letter and a telegram from Dr. E. J. G. Beardsley, Governor for eastern Pennsylvania, recommending that the College should elect a Governor for the State of Delaware.

Upon motion by Dr. Richards, seconded by Dr. Griffith, and regularly carried, it was

RESOLVED, that the Nominating Committee be requested to make a nomination for a Governor for the State of Delaware.

Dr. C. H. Cocke, Vice-Chairman of the Committee on Credentials for Associateship, reported for that Committee in the absence of the Chairman, Dr. Allen A. Jones. The Committee recommended to the Board of Governors for their approval to the Board of Regents the election of 85 physicians. (A list of those recommended may be found in the minutes of the meeting of the Board of Regents for April 6, 1932.)

On motion by Dr. Griffith, seconded by Dr. Holt, and regularly carried, it was

RESOLVED, that the report of the Credentials Committee be received and that the candidates be recommended to the Board of Regents for election to Associateship.

The Executive Secretary then presented a list of twenty members delinquent in dues for more than two years. He stated that every possible means had been resorted to in order to collect the dues from these members, and that, as his last resort, he had notified them that they would be dropped from the rolls of the College at this meet-

ing, should their dues not be paid. This list represents those who have failed to comply with the requirements of the By-Laws, and are to be presented to the Board of Regents for being dropped for delinquency.

Upon inquiry from one of the members of the Board, Chairman Stewart explained the procedure that must be followed in order to drop an undesirable member. The By-Laws, Article XIII, Section 1, provides a method of expulsion.

Dr. Lisser, Governor for northern California, suggested the desirability of sending a letter to the entire membership of Fellows, stating clearly that the College is not interested in number, but is distinctly interested in the quality of candidates, and suggesting that in the future Governors may not be put in the awkward position of being asked to endorse candidates whom they do not consider qualified for election. Dr. Lisser also raised the question concerning the candidate who lives at such a distance that it is not possible for the Governor to meet or to know him personally. Chairman Stewart replied that it is, of course, desirable to contact each candidate, but if, because of distance, the Governor is not able to visit the candidate or have the candidate visit him, he should write to physicians, preferably members of the College, residing in the same community in which the candidate lives, inquiring specifically about the candidate's professional standing, medical ethics, and other relevant details helpful in determining the candidate's fitness for election.

Adjournment.

APRIL 7, 1932

The Board of Governors of the American College of Physicians met and was called to order at the Palace Hotel, San Francisco, Calif., at 12:45 P.M., by the Chairman, Dr. W. Blair Stewart, Atlantic City, N. J.

The following were present: Dr. W. Blair Stewart, Dr. Ernest B. Bradley, Dr. James G. Carr, Dr. Charles Hartwell Cocke, Dr. T. Homer Coffen, Dr. A. Comingo Griffith, Dr. Josiah N. Hall, Dr. Thomas Tallman Holt, Dr. Ernest E. Laubach, Dr. Hans Lisser, Dr. Leander A. Riely, Dr. G.

G. Richards, Dr. Adolph Sachs, Dr. Charles T. Stone, and Mr. E. R. Loveland, Executive Secretary.

The Executive Secretary presented the financial reports for the year ended December 31, 1931, and discussed them in detail.

Chairman Stewart asked for expressions of opinion, individually or collectively, upon the question of where the next annual meeting of the College should be held. He reported that invitations had been received from Pittsburgh, Montreal, Chicago, Memphis and Indianapolis, and that while the meeting city would be selected by the Board of Regents, they would appreciate the recommendations of the Board of Governors. After discussion of present economic conditions, the ability of different cities extending invitations to provide necessary requirements for a Clinical Session of the College, etc., the consensus of opinion was that a central location should be selected, and that the invitations of Chicago and Pittsburgh be particularly considered.

Chairman Stewart stated that the San Francisco meeting had been one of the outstandingly successful gatherings of the College, and that much credit was due to members from San Francisco and California, generally.

On motion by Dr. Cocke, seconded by Dr. Bradley, and regularly carried, it was

RESOLVED, that the Board of Governors of the American College of Physicians express its appreciation and gratitude for a most excellent program given by the California men, and that this appreciation be extended particularly to Dr. William J. Kerr, General Chairman, and to his various Committees.

Chairman Stewart then expressed his appreciation and thanks to the members of the Board of Governors who had come to the meeting. He asked members of the Board always to bear in mind the desirability of raising the standard of the College a little higher than it was prior to the adoption of the amendments to the present Constitution and By-Laws; that Governors

should remember that while new candidates for Associateship are not required to present the qualifications for full Fellowship, no candidate should be endorsed unless he promises to qualify for Fellowship within a period of three to five years.

Dr. Stewart thanked the Governors also for responding promptly to communications and inquiries from the Executive Secretary with regard to candidates, and asked them to co-operate in selecting from the Associates in the different districts those men who are eligible for proposal for Fellowship. While the College is not seeking large numbers, it is important to select from the list of Associates in the different states those men who possess outstanding qualifications and who will make good as Fellows.

On motion by Dr. Bradley, duly seconded and regularly carried, it was

RESOLVED, that the Board of Governors express its appreciation of the work of the Executive Secretary, Mr. Loveland.

Before adjournment, Dr. Cocke, for the Committee on Credentials, requested all members of the Board to give earnest consideration to the recommendation of candidates, in an effort to assist the Committee in passing on men proposed for membership. He stated that the comments received about the same candidate are often widely different; that in many cases one Governor will heartily approve of a candidate and another Governor will have emphatic objections to the same man, making it very difficult for the Committee on Credentials to reach a decision concerning election. Dr. Cocke also stated that many cards are returned stating that the candidate is "unknown", which emphasizes the need of having the Governor make thorough investigation through friends, acquaintances, or other members of the College, and to send such personal and definite information for the attention of the Committee.

Adjournment.

E. R. LOVELAND,
Executive Secretary.

GENERAL BUSINESS MEETING
OF THE
AMERICAN COLLEGE OF PHYSICIANS
SAN FRANCISCO, CALIF.,
APRIL 7, 1932.

The General Business Meeting of the American College of Physicians, held in connection with the Sixteenth Annual Clinical Session in the Gold Ballroom of the Palace Hotel, San Francisco, Calif., convened at 4:45 P. M., Thursday, April 7, 1932; Dr. S. Marx White presiding.

Dr. White said in part: "This meeting in San Francisco has been one of the delightful experiences on the part of the members of the College. It has been a privilege to me to serve the College in the capacity of its presiding officer during the past year and have a part in the preparation of the program. This is the second meeting to use the new method of program-making by which the President makes up the national program, dividing the responsibility so that the General Chairman and the Local Committee make up the clinical program. San Francisco has given us one of the unique meetings. I was extremely anxious that during this meeting there should be an opportunity for the Fellows of the entire country to learn what 'our other metropolis' has to show."

The reading of the Minutes of the last meeting was dispensed with.

The Treasurer commented on his report which had been previously published in the *ANNALS OF INTERNAL MEDICINE*. An interesting comparison of the finances of the organization was made. Dr. Jones stated that at the time of taking over the office of Treasurer eleven years ago, there was about \$8,000 in the treasury, and that the amount in the treasury at the present time was around \$130,000. In retiring as Treasurer, Dr. Jones expressed the hope that the finances would progress rapidly, and that the endowment fund might continue to increase and be sufficient to carry on such work as was done this year in presenting the John Phillips Memorial Prize. Dr. Jones expressed his appreciation of the courtesies and considerations that had been shown him by the Fellows during the eleven years that he was Treasurer.

Upon motion, the report of the Treasurer was accepted.

The Executive Secretary presented his annual report, mentioning among other matters the publication of the 1931-32 Directory, with membership statistics, including 5 Masters, 2286 Fellows and 572 Associates, a total of 2863. He reported that there were twenty-eight Life Members, including the retiring President, Dr. White, as the most recent one. He also reported that the registration at the Clinical Session was 1,586, of which 133 were visiting ladies. An invitation was extended to all members of the College to visit the headquarters at Philadelphia whenever they are in that City.

Dr. John Dudley Dunham, Columbus, Ohio, proposed a rising vote of thanks, which was given, to the San Francisco members responsible for the splendid entertainment and magnificent program furnished.

Dr. White said in part: "Before relinquishing the chair, your President wants to outline one or two considerations which occurred to him during this year, and the year previous. The College has won a place in American medicine in the sixteen years of its activities. I feel strongly that the American Medical Association has its prime place in the professional and economic life of Medicine in this country; that there is a place, however, for other organizations with special interests, and a place which can be of extreme and extraordinary usefulness.

"Not only is there opportunity for professional advancement and for the study of the specific problems which a group like ours might desire to consider, in the interests of the type of work which we represent in American Medicine, but there is also an opportunity and a necessity for a study and discussion of some of the economic questions in Medicine. I have no desire to outline them at this time—I tried to outline them briefly in my address last night; but it seems to me that much as we should like to retain our clinical interests only, we will be re-

quired, through the years which are immediately ahead, to take some very definite part in the study and recommendations on economic problems. Just how that is to be brought about seems to be a very difficult matter for us to decide. I am thoroughly aware that pronouncements on economic questions in medicine are extremely difficult; our basis for understanding is different; the approach which each of us makes to various problems is so different. I think the ideals of all of us look very much in the same direction, and yet, economic considerations will be forced upon us, and only as we are in position to study them and at least to mark out what are safe and sane and effective approaches to our economic problem, can we expect to keep up with the rapid crystallization which is eventually coming to us in Medicine. How that is to be brought about, I have no recommendations to make; but this body as a whole, I feel, must be prepared and should be thinking strongly along lines other than the clinical one."

The retiring President, Dr. White, presented the incoming President, Dr. Francis

M. Pottenger, of Monrovia, Calif., who made the following remarks:

"I wish to thank you for this great honor you have conferred upon me. I never had any anticipation that I might be President of this organization. I have always worked for this organization. I have been on the Board of Counsellors and Regents since its inception. When it was brought to my notice in the beginning, I thought it was one of the greatest opportunities for Internal Medicine that had ever been offered in America, and I still think that is what we have. I have attended all the meetings since its organization, except one, and I have seen it grow in interest and in usefulness, ever feeling that this organization is fulfilling the wants of its members.

"I simply want to say to you that I will do my best. My predecessors have set a pace and I hope I can progress throughout my administration. I ask you all to help me."

In the absence of Dr. Stengel, Chairman of the Nominating Committee, Dr. Stewart submitted the following report:

"The Nominating Committee of the American College of Physicians begs to offer in nomination:

For the Elective Offices:

President-Elect	George Morris Piersol, Philadelphia, Pa.
First Vice President	Maurice C. Pincoffs, Baltimore, Md.
Second Vice President	Charles G. Jennings, Detroit, Mich.
Third Vice President	Noble Wiley Jones, Portland, Ore.

For the Board of Regents:

(Term Expiring 1935)

Arthur R. Elliott	Chicago, Ill.
James B. Herrick	Chicago, Ill.
S. Marx White	Minneapolis, Minn.
David P. Barr	St. Louis, Mo.
Clement R. Jones	Pittsburgh, Pa.

For the Board of Governors:

(Term Expiring 1935)

Egerton L. Crispin	(Southern) CALIFORNIA—Los Angeles
Gerald B. Webb	COLORADO—Colorado Springs
Henry F. Stoll	CONNECTICUT—Hartford
William Gerry Morgan	DISTRICT OF COLUMBIA—Washington
Ernest E. Laubaugh	IDAHO—Boise
Samuel E. Munson	ILLINOIS—Springfield
Robert M. Moore	INDIANA—Indianapolis
Thomas Tallman Holt	KANSAS—Wichita
Roger I. Lee	MASSACHUSETTS—Boston
Adolph Sachs	NEBRASKA—Omaha
Allen A. Jones	(Western) NEW YORK—Buffalo
Leander A. Riely	OKLAHOMA—Oklahoma City
Edward J. G. Beardsley	(Eastern) PENNSYLVANIA—Philadelphia
Edwin Bosworth McCready	(Western) PENNSYLVANIA—Pittsburgh
John O. Manier	TENNESSEE—Nashville

G. C. RichardsUTAH—Salt Lake City
 Jabez ElliottONTARIO—Toronto, Canada
 William M. JamesPANAMA AND THE CANAL ZONE

(Term Expiring 1934)

Lewis B. FlinnDELAWARE—Wilmington
 Fred Todd CadhamMANITOBA—Winnipeg, Canada

(Term Expiring 1933)

Oliver Clarence NelsonARKANSAS—Little Rock

A resolution was regularly adopted, accepting the nominations and electing the nominees. Dr. George Morris Piersol, President-Elect, spoke a few words of appreciation for the honor bestowed upon him.

The meeting adjourned at 5:35 P. M.

E. R. LOVELAND, Executive Secretary.

Dr. Hugh S. Cumming (Fellow), Washington, D. C., U. S. Public Health Service, has been reappointed and confirmed to the office of Surgeon General for another term of four years.

Dr. William Gerry Morgan (Fellow), Washington, D. C., has been appointed a member of the Council from the District of Columbia of the Southern Medical Association, the reappointment having been announced recently by the President, Dr. Lewis J. Moorman (Fellow), Oklahoma City, Oklahoma.

Dr. Joseph Yampolsky (Fellow), Atlanta, Georgia, has been elected First Vice-President of the Fulton County Pediatric Society, for 1932.

Dr. William Stroud (Fellow), Philadelphia, Pa., professor of cardiology in the Graduate School of the University of Pennsylvania, gave a lecture in the Sunbury High School auditorium, January 19, on "The Presence of Heart Disease in Children".

Dr. Paul D. White (Fellow), Harvard Medical School, Boston, Mass., gave an address before the Richmond Academy of Medicine on February 9, his subject being "The Treatment of Cardiovascular Disease".

Dr. White was also a visitor to the Medical College of Virginia this month, and gave a clinic for third and fourth year medical students.

Dr. James S. McLester (Fellow), Birmingham, Ala., professor of medicine, University of Alabama, delivered the third annual Stuart McGuire Lecture of the Medical College of Virginia, Richmond, on the night of March 4. Dr. McLester, a special investigator in the field of nutrition, spoke on "Nutrition in Its Newer Aspects".

Dr. Jonathan C. Meakins (Fellow), Montreal, Que., Canada, addressed the San Francisco County Medical Society, March 15, on "Treatment of Cardiac Irregularities".

Dr. George Piness (Associate), Los Angeles, Calif., addressed the San Diego County Medical Society, March 8, on "Practical Application of Allergy in General Medicine".

Dr. Louie M. Limbaugh (Fellow), and Dr. Thomas M. Palmer (Associate), both of Jacksonville, Fla., participated in a symposium on the value of the Mantoux tuberculin reaction in the diagnosis of the childhood type of tuberculosis, held before a recent meeting of the Columbia County Medical Society.

Dr. William W. Graves (Fellow), St. Louis, Mo., addressed the Madison County Medical Society, March 4, at Alton on "Practical Basis in the Diagnosis of Neurologic Conditions".

Dr. William F. Lorenz (Fellow), Madison, Wis., presented a paper before the Chicago Neurological Society, March 17, on "Confessions Obtained During Narcosis".

Dr. John H. Musser (Fellow), New Orleans, La., addressed the East West Feliciana

Bi-Parish Medical Society in Jackson, February 3, on "Some Facts About Nutrition".

The fifth course of lectures under the William Sidney Thayer and Susan Read Thayer Lectureship in clinical medicine at Johns Hopkins Hospital, was given March 22-23, by Dr. Alphonse R. Dochez, professor of medicine, Columbia University College of Physicians and Surgeons, New York.

Dr. George B. Eusterman (Fellow), Rochester, Minn., addressed the Wayne County Medical Society, Detroit, March 15, on "Incidence and Nature of Gastric Lesions Masquerading as Benign Disease".

Dr. Adolph E. Voegelin (Fellow), Detroit, Mich., recently delivered four lectures on cardiology at the Evangelical Deaconess Hospital.

Dr. Horace W. Soper (Fellow), St. Louis, Mo., spoke on "Diagnosis of Carcinoma of Colon" at the meeting of the St. Louis Medical Society, February 23, 1932.

Dr. James Alexander Miller (Fellow), New York, was among the speakers at a meeting of the advisory council of the Milbank Memorial Fund, March 16-17. The council met in groups, in which discussions were held on health centers, health education and tuberculosis in children, population studies and public health nursing.

Dr. Cyrus C. Sturgis (Fellow), Ann Arbor, Mich., addressed the Cleveland Academy of Medicine, March 18, on "The Outlook of the Patient with Pernicious Anemia".

Dr. Charles W. Burr (Fellow), Philadelphia, Pa., contributed to a program dedicated to the memory of Dr. Charles K. Mills, one of the founders of the Philadelphia Neurological Society, at a meeting of that organization held March 18.

The following Fellows appeared on the fourth annual spring clinical conference

sponsored by the Dallas Southern Clinical Society, held at Dallas, March 28-April 2:

Dr. Thomas R. Brown, Baltimore, Md.—
"The Story of Digestion and Indigestion";

Dr. Samuel A. Levine, Boston, Mass.—
"Bedside Recognition of Irregularities of the Heart";

Dr. Williams McKim Marriott, St. Louis, Mo.—
"Practical Points in the Care and Feeding of Infants".

Dr. John E. Walker (Fellow), Opelika, Ala., addressed the sixty-fifth annual session of the Medical Association of the State of Alabama, at Mobile, April 19-22. His subject was "Bacteriophage: Its Nature and Therapeutic Application".

Dr. George T. Harding, Jr. (Fellow), Columbus, Ohio, spoke before the Muskingum Academy of Medicine, Zanesville, March 2, his subject being "Intoxication Psychoses and Bromides".

Dr. Cassius H. Hofrichter (Associate), Medina, Wash., addressed the King County Medical Society, Seattle, March 7, on "Tooth Decay, Diet and Vitamins".

Dr. Harry R. Litchfield (Fellow), Brooklyn, N. Y., conducted the Pediatric Pathological Conference at the Cumberland St. Hospital of Brooklyn, March 30, 1932. At this conference he contributed a paper on "Congenital Syphilis".

Dr. Louis Faugeres Bishop, Jr. (Fellow), New York City, presented an example of congenital malformation of the aortic cusps, with detailed report, before the Society for Clinical Study, at its meeting on January 26, 1932.

On March 22, 1932, Dr. J. Reid Broderick (Fellow), of Savannah, Georgia, addressed the Georgia Medical Society in Savannah on the subject, "Coronary Thrombosis and Angina Pectoris".

OBITUARIES

DR. ELMER HENDRICKS FUNK

Dr. Elmer Hendricks Funk (Fellow), Philadelphia, a much respected and admired clinician of the Quaker City's, so termed, "younger group" and a medical teacher and writer of rare individuality and charm, died suddenly of angina pectoris at his home in Overbrook, Pennsylvania, on May 13, 1932; aged 46 years.

He was born, reared and educated in Philadelphia, being an honor graduate of the Jefferson Medical College in 1908, and having subsequently served the Jefferson Medical College Hospital, successively, as Resident Physician, Chief Resident Physician, Medical Director and Medical Director and Physician in Charge of the Department for Diseases of the Chest. He also served as Resident Physician in the Philadelphia Hospital for Contagious Diseases and at the White Haven Sanitarium for Tuberculosis.

Dr. Funk inherited a pleasing and gracious personality and possessed a cheerful, unselfish and happy disposition. Early in his medical career the kindly Fates brought him into intimate contact with a select group of vigorous and inspiring personalities for whose names and traits all Philadelphians are justly proud. To mention but three of a much larger number whose wholesome influence would prove a decided stimulus to any medical man, even if he were far less gifted and brilliant in intellect than was Elmer Funk, will suffice. To have enjoyed frequent conferences with such sterling and altruistic characters as the late lamented Judge Mayer Sulzberger and the Hon-

orable William Potter or the, fortunately for Philadelphia and for the Jefferson Medical College and Hospital, still active and enthusiastic Alba B. Johnson, was ideal training for a young man's mental and spiritual growth. To work early and intimately, for a period of years, with such excellent physicians as Hobart A. Hare, F. X. Dercum, W. M. L. Coplin, Randle C. Rosenberger, J. Parsons Schaeffer, Francis Stewart, Albert P. Brubaker, James C. Wilson, S. Solis-Cohen, Chevalier Jackson, E. Quin Thornton, John H. Gibbon, J. Chalmers Da Costa, Thomas McCrae and similar practical idealists in the profession of medicine, is the traditional kind of training that tends to produce the high type of physician that Elmer Funk became. A little later in his life, fortunate chance brought about a professional intimacy with such inspiring men as Lawrence F. Flick, James M. Anders, Charles J. Hatfield, Henry Page, H. R. M. Landis, George W. Norris, Arthur Newlin, Eugene Opie and Joseph Walsh. Elmer Funk was a fortunate youth to possess such professional colleagues and friends, and they were equally fortunate to work with such a wholesouled and appreciated junior associate.

Dr. Funk became interested in medical teaching and writing even in his undergraduate medical student days, and he later served faithfully, brilliantly and helpfully as Demonstrator, Lecturer, Assistant Professor, Associate Professor and Clinical Professor of Medicine in his Alma Mater.

In September, 1931, Dr. Funk was selected, by unanimous vote of the

Board of Trustees of the Jefferson Medical College, to succeed the late Hobart A. Hare as Professor of Therapeutics in that century-old institution. Few medical men, in any age, have crowded as much of work, study, investigation, research, teaching, writing, lecturing, work for organized medicine and civic philanthropy as Dr. Funk accomplished in his too brief span of years into their lives.

Dr. Funk had an active part in many organizations and was, perhaps, best known for his intimate knowledge of diseases of the respiratory system. He was assistant editor of the third edition of the "Osler System of Medicine," and in 1930 published a book entitled, "The Diseases of the Respiratory Tract".

His interest in all phases of tuberculosis, and the active part that he played in the campaign against this disease, resulted in his frequently being termed "a tuberculosis specialist".

Dr. Funk became a Fellow of the American College of Physicians on April 1, 1923. At the recent Clinical Session of the College at San Francisco, he was unanimously selected as Treasurer. He was a member of the Council of the Association of American Physicians; for a number of years he had been the Recorder of this Association.

He was an admired and beloved member of the Interurban Medical Club, a former President of the Pennsylvania Tuberculosis Association and a charter member and active worker of the Philadelphia Health Council. Dr. Funk was an active Fellow of the College of Physicians of Philadelphia, and was Visiting Physician to the Jefferson Medical College Hospital the

Pennsylvania Hospital and White Haven Sanitarium. He was a fluent speaker, a teacher of exceptional talent and ability and a generous contributor of excellent papers to all medical publications. His premature death has robbed the medical profession of a forceful and useful member; and he will long be lovingly remembered by his host of friends and patients.

(Furnished by E. J. G. BEARDSLEY, M.D., F.A.C.P., Governor for Eastern Pennsylvania.)

DR. JAMES BIRNEY GUTHRIE

Dr. James Birney Guthrie (Fellow), the son of J. B. Guthrie and Clara Merrick, was born in New Orleans on January 3, 1876. His maternal grandfather was E. T. Merrick, Sr., Chief Justice of the Supreme Court of Louisiana, and his maternal grandmother was Caroline Merrick, pioneer worker in the ranks of the woman suffrage movement.

After his preliminary education in the public schools of New Orleans he entered Tulane University of Louisiana, from which he received the degrees of bachelor of science in 1896, and of doctor of medicine in 1900. He was the valedictorian of his class in the medical school. He served for two years as an intern at Charity Hospital. Immediately upon his graduation in medicine he was appointed Lecturer and Instructor in Materia Medica and Therapeutics at Tulane University. After four years he was promoted to the position of Associate Professor of Clinical Medicine, and in 1910 he was made Professor of Clinical Medicine, which position he held until 1928. In 1931 he was appointed Professor and Head of the Department of Medicine

in the new Louisiana State University Medical School. He was serving in this capacity at the time of his death.

Dr. Guthrie was one of the first group established in New Orleans to conduct a clinical laboratory, in 1902. He was a pioneer in the field of clinical roentgenology, having set up one of the first x-ray apparatuses in New Orleans. At that time he had only an old static machine and improvised an interrupter of his own. From the time of his entrance into the Charity Hospital as an intern he served that institution uninterruptedly except for the term of his military service. He was a strict disciplinarian and his wards were always most carefully attended. He was the first roentgenologist at Touro Infirmary and when he retired from this field to devote himself entirely to clinical medicine he was named consultant in medicine at that institution. In this capacity he gave 10 years of devoted service to the diabetic clinic. At one time he was chairman of the staff at Hotel Dieu. Entering the army in 1918 as a major, he went overseas and was discharged in the spring of 1919 as lieutenant colonel. Subsequently he attained the rank of colonel in the Medical Reserve Corps.

Dr. Guthrie was always active and interested in the work of organized medicine. He was a member of the Orleans Parish Medical Society, Louisiana State Medical Society, American Society of Tropical Medicine, American Medical Association, Association of Military Surgeons. He was elected to fellowship in the American College of Physicians on March 9, 1928. He was president of the Orleans Parish Medical Society in 1928.

Dr. Guthrie had been ill for a number of weeks. The cause of his death, on March 8, 1932, was acute pericarditis.

(Furnished by RANDOLPH LYONS, M.D., F.A.C.P., Governor for Louisiana.)

DR. WILLIAM CHARLES HEUSSY

Dr. William Charles Heussy (Fellow), Seattle, Washington, died March 21, 1932, following an operation for obstruction of the common bile duct; age 62.

Dr. Heussy was born in Buffalo, N. Y., attended the public schools there and later graduated from the University of Buffalo School of Medicine in 1895. He did postgraduate work at the Sloan Hospital and the London Hospital, of England; at the University of Edinburgh; at the Rotunda Hospital of Dublin, Ireland; and at the University of Pennsylvania. From 1906 to 1910, he was Lecturer on Hygiene at the Providence Hospital; from 1910 to 1912, President of the Board, Minor Hospital; 1913, Consulting Physician, City Hospital; 1916, Consulting Physician, King County Hospital; and from 1925 until 1928, Chief of the Medical Staff of the Columbus Hospital. He was Vice President of the Staff at this Hospital at the time of his death.

Dr. Heussy was a member of the King County Medical Society, Washington State Medical Association, Fellow of the American Medical Association and past President of the Association for the Study of Internal Secretions. He was elected a Fellow of the American College of Physicians in 1917.

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**Doe, John: What I know about it, Jr. Am. Med. Assoc., 1931, xcvi, 2006-2008.*

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